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No. XV. OF VOL. I., 1941. LONDON, SATURDAY, APRIL 12, 1941. Pp. 72—Price 1s.
No. 6137. VOL. CCXL. Founded 1823. PUBLISHED WEEKLY. Registered as a Newspaper. Annual Subscription: Inland £2 2s. Abroad £2 10s.

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No. 6137 LONDON: SATURDAY, APRIL 12, 1941 CCXL

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ORIGINAL ARTICLES

WOUNDS OF THE KNEE-JOINT*

BY W. H. OGILVIE, M.Ch. Oxfd, F.R.C.S.
COLONEL, A.M.S.; SURGEON TO GUY'S HOSPITAL

THE last war saw the re-establishment of the simple outlook on infection and wound healing that had been taught by Hunter and Lister, but obscured by later discoveries. The outlook remains unchallenged, but the actual methods of 1918 are not necessarily applicable to the changed conditions, both of war and of surgery, that are met today. Then nearly all wounds were caused by fragments of high explosive in exhausted and mud-soaked men; now they are inflicted by many different weapons, often under almost sterile conditions. Then early excision was the only sure safeguard against infection or gangrene, but new therapeutic agents have since appeared—particularly improved sera, the sulphonamide drugs, and preserved blood and plasma—that can help the resistance of the tissues so powerfully that less drastic surgery is often possible. Then casualty clearing stations had all the refinements and immobility of a civil hospital; today the aeroplane prohibits elaboration in front-line units, and discourages the use of methods that demand a large staff and constant supervision, or whose success would be jeopardised by sudden evacuation. Thus the surgery of this war promises to be more complex and yet more simple than that of the last; there will be more therapeutic alternatives, more conservative operations and fewer destructive ones, but all methods must be straightforward and foolproof.

Where wounds of joints differ from those of non-articular parts of the skeleton they differ for the worse. A joint is a cavity of complex shape, lined by structures whose resistance to infection is below the average. It cannot be laid widely open for surgical toilet without destroying its mechanism, it cannot be cleansed and washed out easily, and it cannot be drained efficiently. If infected it becomes a deep pocket from which toxic absorption takes place readily, and from which pus tracks along tissue planes when the capsule is ruptured. In the middle of a limb nerves are scattered and there are alternative blood channels; round a joint nerves and vessels are bundled together and often destroyed by the missile that wounds the joint. A bone will function as long as it has continuity, and if the ends are in their correct relationship it will work well however bizarre its shape may be between, but a small amount of damage will render a joint useless. Moreover, a bad joint is worse than no joint; in other words, pain and instability are worse than ankylosis.

The knee is the largest articulation, and therefore gives most opportunities for conservative and reconstructive surgery. While important structures are grouped round other joints, in the knee they are all placed behind, so that uncomplicated articular injuries are more common; on the other hand, its size renders any infection particularly dangerous. The synovial membrane lining the knee-joint is very extensive. It resists infection poorly, but it has antibacterial powers, and can also form adhesions and limit sepsis to part of the cavity. The main compartments are the subcrureal pouch above and in front, and the two condylar pouches behind; the ligamenta alaria seal the first from the second two, the cruciate ligaments and the ligamentum mucosum the two posterior pockets from each other. These folds when inflamed can limit the spread of infection, unless movement or tension force their barriers. Immobilisation of an injury of the knee, from the earliest moment until infection has been averted or overcome, is therefore the key to success.

In a forward area, local treatment is limited to cleansing the skin, applying an abundant sterile dressing and immobilising the limb for transport. The Thomas is the best primary splint, but Cramer's wire or a wooden splint may be applied or the legs may be tied together. Any form of immobilisation is better than none. The first dose of a prophylactic course of sulphanilamide, three tablets crushed and taken with a drink of hot lemonade, should be given if possible, and the amount and time noted on the card.

WOUNDS SEEN WITHIN SIX HOURS

At the casualty clearing station or the first operating centre reached, every wound of the knee-joint must be regarded as an urgent case for examination and probable operation. The most important group will be those seen within the "pre-infective" or "grace" period of six hours. Such cases may be roughly divided into (1) those without bone injury; (2) those with injury to the patella only or partial injury of femur or tibia; and (3) those with complete fracture of femur or tibia or complicated by vascular injury. In the first group, through and through bullet wounds with punctured entry and exit holes do not usually require operation; wounds with low-velocity projectiles often come in the same category. At times of stress these can be evacuated further, temporary immobilisation being replaced by something efficient, and the course of sulphanilamide continued. If however they can be retained they must be watched carefully; the joint must be aspirated if it gets at all tense, and immobilisation must be continued till infection is clinically overcome. The early movement of injured joints is as unsound as the early movement of fractures. Movement will be regained more certainly if we aim at preserving the apparatus of movement, that is the integrity of the joint, than if we practise the desired movements before the joint has settled down. Where evacuation is a pressing need, it must be remembered that bullet wounds are always less serious than shell wounds of a similar nature, and that an open wound of a joint with escaping synovial fluid is less likely to go wrong if properly immobilised than a valvular wound or a damaged joint distended with fluid or blood.

Apart from the group that are left alone for preference and those that are left under stress, the majority of penetrating wounds of the knee-joint of the first class, and all those of the second class with injury to the patella or partial injury to the other bones, should be operated on. Before operation every case must be radiographed to detect and localise foreign bodies and to determine the amount of bone damage. During the period of investigation and preoperative skin preparation the limb should be moved as little as possible. Operation should be done under a tourniquet with the strictest aseptic precautions. The wound track, if a simple one, is excised in one piece down to and including the hole in the synovial membrane. Where conditions permit, it is well to change instruments at this stage. The joint is then opened along anatomical planes sufficiently to allow inspection and cleansing of its interior. Foreign bodies are picked out. The cavity is irrigated thoroughly with 1/1000 flavine, which will remove the blood clot and will often wash out bits of cloth or fragments of metal. Local injuries to bone are treated as radically as possible. A patella splintered by a projectile should usually be removed completely. Holes in the femoral condyles or the articular surface of the tibia may be scraped with a curette or trimmed with a small gouge till they are smooth cavities lined with apparently healthy bone. It was a common practice in the last war to dry such cavities with spirit and rub them lightly with bipp. Today the place of bipp would be taken by powdered sulphanilamide, dry or mixed in a paste with Vaseline, and such a practice is thoroughly sound.

After excision the difficult question of subsequent treatment must be decided. Up to the present our experience and that of the French has been that primary suture, even under the most favourable conditions of wound, patient, surgeon and hospital, is a risky experiment, one that has more often been disastrous than successful. In the knee, however, suture, or at any rate partial suture, should be tried if at all possible, for a

* Based on a lecture delivered at the British Postgraduate Medical School.

drained knee nearly always means limited movement and often complete stiffness afterwards. Where a knee wound in a fit patient is received by the surgeon within 6 hours and is treated by thorough debridement including the removal of all foreign bodies, the synovial cavity at least should be closed by interrupted sutures of the finest catgut. In closing it, any bone lesion should if possible be exteriorised by mobilising or turning down flaps of synovial membrane; owing to the size and mobility of the subcrureal pouch this is often possible with partial lesions of the femoral condyles. Some writers advise that the capsule should be closed as well, but this step is not without risk, since suture of a defect in such a tough structure leads to tension which is inimical to clean healing. The skin may be closed with interrupted sutures in a favourable case, but if there is any doubt it is better to pack the outer layers of the

FIG. 1—Sketch of radiogram showing bullet and splinters. These were not removed and did not interfere with union. Some of the fragments emerged through the perineum.

FIG. 2—Limb after removal of plaster. Ink line marks route of bullet. Six months after the injury there was full extension of the knee-joint and flexion to a right angle.

wound with vaseline gauze down to the synovial membrane, rather than to risk a subcutaneous infection which will later invade the joint. After a well-planned and well-executed operation, well-planned and well-executed immobilisation is equally important, and careful supervision even more so. The only apparatus that gives 100% immobilisation of the knee is a plaster spica, and it is therefore better to use this method than to retain the advantages of inspection and extension that a Thomas splint allows. Sulphanilamide should be given for a full 4 days in every case. The progress is judged by the condition of the patient, his chart and the comfort of his leg, and the dressings are left alone for at least 10 days. If evacuation is imperative before this time, no joint wound should be allowed to travel with sutured skin. Whatever grounds there may be for optimism the surface stitches should be removed and the skin wound packed lightly open before the patient is allowed to leave.

Of the third class, wounds with complete fracture of the tibia or femur, little need be said. Such wounds are often complicated by injury to vessels or nerves and demand primary amputation. Where there is no such injury, a debridement as thorough as possible should be done under a tourniquet. The synovial membrane should again be closed as completely as the defect will allow, but further suture is unwise. The wounds are therefore packed with vaseline gauze, and the limb immobilised in a plaster spica. An injury to the head of the tibia is usually more serious than one to the femoral condyles; the bone lesion cannot be excluded from the synovial cavity as can one in the femur, it can less often be excluded from the surface, and the softer cancellous bone is more liable to infection.

WOUNDS SEEN LATER

Wounds of the knee-joint received between 6 and 24 hours after infliction require anxious consideration. Some will be clean enough for debridement, as judged by the appearance of the wound and its surroundings, the condition of the patient, his temperature and pulse, and possibly the kind of fluid that flows or is aspirated from his joint; but at this period the skin should not be sutured. Others will be frankly infected. In between will be cases where the wound is a little angry but the joint is not really septic, where drainage must be established and foreign bodies removed. In these, limited debridement designed to cleanse the track and remove foreign bodies and loose bone fragments should be done, but it is necessary to work cautiously, incising undamaged tissue as little as possible and keeping the dissection to the already damaged zone. The joint should be washed out with weak flavine solution and afterwards the whole track should be packed with vaseline gauze, the synovial hole being left open or closed in part. The limb is immobilised as before in a plaster spica, and the patient put on a course of sulphanilamide.

After 24 hours the bacteria have established their entry and the tissues have established their defences. The time for debridement is past, and the alternatives are expectancy or drainage. The decision will above all depend on whether infection is being overcome or is likely to be overcome, or whether it is getting the upper hand, in short whether the patient is doing well or doing badly. Many cases which, had they arrived earlier would undoubtedly have been taken to the theatre, now appear to have combated their infection. Among such may even be wounds where the projectile is still in the body but out of the joint.

A soldier, wounded at Dunkirk, reached hospital in England five days later with an entry wound on the inner side of the right knee, and synovial fluid pouring out. The bullet had passed up, struck and fractured the femur and was lying in pieces all round the upper part of the thigh (figs. 1 and 2); no attempt was made to remove any of the fragments. With drainage and plaster and a course of sulphanilamide he recovered with nearly full knee movement.

A fit patient, good immobilisation, smooth transport and prophylactic chemotherapy may all have contributed to the result. Here the wise policy is to continue immobilisation and sulphanilamide, watch carefully the condition of the patient and the wound, aspirate the joint if need be, be ready to drain or to cut down on a foreign body—in short to pray for the best and watch for the worst.

SEPSIS

As in all wounds, the first and most important indications of infection are to be found in the general condition of the patient, his temperature, his pulse and his appearance. A man with a wound of the knee-joint that is doing well looks well and feels well. If the wound is becoming infected he begins to look ill, and an experienced ward-sister will often notice the change before the patient or the doctor. Pain is the most important single symptom; a joint that is painful is an indication for alarm. Examination of the dressing will tell us more, and the indications of mischief are in the surroundings rather than in the wound itself. If the surrounding skin is soft and cool and the joint is not tender, there is little cause for alarm whatever the appearance of the wound itself. Redness, heat, œdema and tenderness of the skin over the joint and pain when the patella is moved sideways indicate infection. Aspiration will usually be performed to aid the decision, for a recently injured joint, whether infected or not, always contains fluid. Clear or opalescent fluid indicates a healthy reaction, turbid or purulent fluid a failure to react. Some blood is to be expected and has no significance, but hæmolysed blood is of grave import since it betokens a streptococcal infection. A moderate number of mononuclear cells indicates no more than a healthy reaction; but polymorphs suggest that infection is getting the upper hand. Organisms can be identified from the fluid in a few hours. *Clostridium welchii* is the least serious if the infection is purely articular. A staphylococcal infection is grave, but will usually yield to energetic treatment. Infection with a hæmolytic streptococcus is the most dangerous.

As soon as infection has been recognised, the knee should be drained, for it is in the infected but undrained

joint that danger lies. The anterior compartment should be opened by two parallel incisions starting opposite the midpoint of the patella on each side and ¾ in. away from it, and extending to the top of the subcrureal pouch, whose extent is determined with a finger. The condylar pouches may be opened as well, by cutting on the point of a pair of hæmostats passed back into them through the lateral incisions; these openings are necessarily too small to drain freely, but they are advisable in severe infections. In the last war it was common practice, after opening the joint, to pass rubber tubes down to the opening in the synovial membrane but not into the cavity, and to rest the limb in a Thomas splint slung from a balkan frame, with an extension of 8–10 lb. pulling through strapping or glue on the leg. The modern practice of packing the drainage incisions with vaseline gauze and immobilising the whole limb in a closed plaster hip spica including the foot and the pelvis appears to be sounder. The aim of extension was to overcome spasm of the muscles, give rest to the limb and prevent pressure necrosis of the articular cartilages. But the rest provided by suspension with extension is that of two cancelled forces and not the complete immobility imposed by a plaster case. The weight removes the pressure from the cartilages, but in doing so tends to open the joint, preventing localisation of the infection and encouraging its spread to the condylar pouches. In any case the battle for a septic knee-joint is virtually decided in 4 days—if the infection is overcome within that period, the joint is saved before the cartilage has had time to suffer; if it is not, joint and cartilage are lost together.

After drainage and fixation, the patient must be watched anxiously. His general condition and his own estimate of the progress of the leg are the only reliable guides. If all goes well, the plaster case should be left undisturbed for a minimum period of 3 weeks; if the patient is not better at the end of 4 days, it is usually better to amputate the leg. The great danger in septic knee-joints is to hang on too long. Most surgeons with experience of the last war would agree that, with this particular injury, there were more lives lost unnecessarily by late amputation than limbs lost unnecessarily by too early amputation. In amputating for sepsis in a patient who is gravely ill, the guiding principles are to do as simple and rapid an operation as possible, to leave the divided tissues widely open, and to arrange things so that the permanent stump which will be obtained by a secondary operation later in a clean field can be made as long as possible. Disarticulation at the knee with a long anterior flap consisting of skin only is the simplest method, but it leaves a vascular bundle practically unprotected by muscles at the most posterior part of the stump, and in these septic cases is very prone to be followed by secondary hæmorrhage. Amputation through the femur just above the condyles, with a long anterior and short posterior flap, is better. The flaps should be approximated by two or three stitches over wide slabs of vaseline gauze covering the divided bone and muscles.

Infected wounds of the knee-joint were responsible in the last war for a high proportion of fatalities at base hospitals, and it is not surprising that a number of alternative methods for dealing with them were evolved. Willems claimed good results by encouraging active movements from the time of drainage; the method is in direct opposition to the basic principle of surgery that injured and infected tissues require rest, and it failed singularly in the hands of other surgeons. Jaboulay's plan of postural drainage aimed at making the suprapatellar pouch, opened in the usual manner, the most dependent part of the joint, thus preventing the pus from distending the condylar pouches, where it is very apt to burst into the popliteal space and track into the calf or thigh along the vascular sheaths. This was attained by nursing the patient on his face, or with the limb projecting vertically from the bed. It is difficult to nurse a patient who is gravely ill and wounded elsewhere in the prone position without moving his septic joint; with a plaster spica the difficulties are less, and the device may often prove useful. The vertical position of the limb is most uncomfortable, and involves some degree of circulatory deficiency in the foot. Open arthrotomy was tried extensively during the middle period of the war. Using a horseshoe incision, like that for a classical excision of the joint, the patella was thrown upwards, and the whole joint laid widely open by dividing the cruciate and lateral ligaments and splinting it in a position of flexion. It was hoped that with unrestricted drainage infection would be overcome rapidly, and that a useful stiff leg could then be secured by excision. In practice the dressing of these large sensitive surfaces proved very exhausting to the patient, and a state sufficiently clean to justify excision was seldom reached; the majority went on to amputation after about a week. Irrigation with Carrel tubes had many advocates, but did not give results comparable to those now obtained by packing the incisions with vaseline gauze and immobilising the limb in plaster. The Carrel method is too elaborate for use in military surgery under the conditions prevailing at present; it does not wash out a complicated cavity like the knee-joint, but rather tends to set up eddies that carry infection to fresh recesses, distend the posterior part of the capsule and lead to sinus formation.

CLOSED PLASTER

Closed plaster is firmly established as the best method of treating the majority of wounds of the limbs under the circumstances of the present war, but it must confer real immobility or it is worse than useless. The surgeon who assumes responsibility for the welfare of his patient must also be responsible for the plaster case that is applied afterwards, though he may not always be able to make it himself. Many bad plasters are put on, not through ignorance but because the surgical teams are so hard pressed in coping with the wounded awaiting attention that they cannot give the time necessary for good plaster work. A second team, trained by the surgeon, working in tandem with him, and showing him their cases at the end of an operating spell is a satisfactory solution. The one-piece plaster case, described by Trueta, made from layers of material cut to pattern and soaked in plaster cream, promises to simplify the application of good casts, for the materials can be brought to the side of the table on a special trolley by a trained sister, and the application is then a matter of minutes only.

A good case must immobilise well enough, far enough and long enough. It can immobilise well only if it is skin tight over the greater part, with no more padding than a little thin felt over the vulnerable bony points, particularly the acromion, the anterior superior iliac spines and the sacrum. Bony points that were formerly considered to be in need of protection, such as the malleoli, remain comfortable if the cast is moulded round them so closely that no movement takes place between them and the plaster. A case must extend far enough to include the joint above and below the injured one. A plaster for the ankle must include the knee, for the knee a hip spica is required. To immobilise the hip-joint a double hip spica is essential, but it need not extend above the iliac crests; the long Witman plaster extending to the nipples is based on the erroneous assumption that the spinal column can be used, like the stick in the toffee apple, to immobilise the pelvis. A plaster for the wrist must go well above the elbow, and one for the elbow or shoulder must include the trunk on a shoulder spica. The case must immobilise the joint uninterruptedly for at least 3 weeks—the shortest time in which it can be assumed that an infective process is overcome and not merely localised. Failure to ensure this is a frequent cause of failure in the surgery of infected joint wounds, for even the slight movement that is unavoidable in changing a plaster may lead to a flare-up of an infection that was walled off, and to the destruction of a joint that might have recovered with movement. Changes of plaster are usually undertaken, not because the patient is ill or uncomfortable, but because the discharge has become offensive or has softened one segment of the plaster and destroyed immobilisation. A good dressing of fluffed gauze should therefore be applied over the vaseline packs, covered by one or two layers of wool firmly bandaged, and the case should be so constructed that its strongest strut is well away from the wound. These measures will protect the plaster, and, if the rest of the case is unpadded, will not interfere with immobilisation.

IDIOPATHIC AND TRAUMATIC NARCOLEPSY

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Today the term narcolepsy is reserved for cases in which there are attacks of uncontrollable sleep, often without known cause. The name was first used in this connexion by Gelineau (1800) and similar cases were described by Westphal (1877) and Fischer (1878). In Gelineau's case, the attacks of sleep were associated with attacks of sudden weakness of the legs, to which Henneberg (1916) gave the name cataplexy. This is the combination of symptoms still occasionally known as Gelineau's disease and now implied by the term narcolepsy. Kinnier Wilson (1928) records that he saw one case in 1907 and failed to find another typical case in the next twenty years, and Spiller (1926) had the same experience. Adie (1926), on the other hand, was able to collect 20 cases, and described the disease as by no means very rare; later (Adie 1930) he reported 50 cases. Within the last few years, cases have become more common and it is doubtful if this increase can be explained merely by more frequent recognition. At the Mayo Clinic a steady increase is reported in the last 10 years.

Hypersomnia is often a symptom in organic disease of the brain, especially in tumours of the third ventricle and in the region of the hypothalamus. In the serious epidemic of encephalitis of 1917, sleep disturbance was such a frequent concomitant, that it was not surprising to find pathological changes in the hypothalamic region (Economo 1923). Dubois (1896) first suggested that there was an actual "sleep centre" in the floor of the aqueduct and third ventricle. Recently a third-ventricle syndrome has been postulated which includes, in addition to hypersomnia and sudden attacks of weakness of the legs, a series of vegetative symptoms due to involvement of the adjacent nuclei of the hypothalamus; these may be disturbances of temperature or of water balance producing polydipsia and polyuria, of the appetite causing bulimia, of the reproductive system causing disturbances in menstruation, and of fat storage causing adiposity. It is rare to find all these symptoms present in any one case. Certainly typical cases, similar to Gelineau's case, have followed in the wake of genuine encephalitis, though they are few (Hall 1924, Adie 1926).

If the syndrome of narcolepsy with cataplexy can be a direct sequel to organic disease—such as tumours or encephalitis in the region of the third ventricle—we should also expect to find it occasionally, after trauma to the skull, as a result of minute hæmorrhages and subsequent softening of the hypothalamic region. I am able to add 3 cases of traumatic narcolepsy to the few already recorded.

SO-CALLED IDIOPATHIC NARCOLEPSY

Gelineau's case was a cooper, aged 38, who had an intense inclination to fall asleep even during meals, and would suddenly lose the power of his legs on laughing heartily or on feeling any other pleasurable emotion. He could be awakened from his sleep if shaken violently, and at once he was wide awake, his head clear. This shows the usual picture. The association of the cataplectic attacks with emotion (laughter, anger) are common but seizures can occur independently of emotion. In the attacks the patient is utterly powerless to move, he becomes a "mass of toneless muscle"; usually the paresis is general, sometimes localised (one arm, both legs, jaw). The attacks seldom last long enough for a full neurological examination to be made, but Kinnier Wilson (1928) was able to record in one case that the pupils reacted to light, slightly but definitely, no corneal reflex was present, the knee-jerks were completely abolished on both sides and the plantar reflex on one exposed foot was extensor. These are remarkable observations considering the attack only lasted about 90 seconds. Attacks lasting 15 min., as reported by Quensel (1925) and others, are unusual. Attacks of cataplexy are so commonly brought on by laughter that many patients hold themselves in check and will not dare a hearty laugh. It is doubtful whether the narcoleptic attacks are really sleep attacks; most patients are completely unconscious during then, but some can afterwards report all that went on though they had been powerless to answer or speak except for an occasional grunt. Superficially the patients appear to be in a natural sleep; some will awake to a light touch or a call, others require more strenuous stimulation. Most on awakening declare they are quite fresh and are at once wide awake, but some are irritable, mentally dull or even angry, as if their needs had not been duly satisfied. The attacks usually come on without warning, but anything tending to induce sleep—such as a heavy dinner or the monotonous hum of a motor-car—will cause sleep more readily than normally. The patient usually feels an imperious desire to sleep which cannot be resisted and is often dreamless. The usual nocturnal sleep is not influenced and dreams occur as usual. An attempt to resist the narcoleptic attack may bring on an attack of cataplexy. Usually both attacks coincide, but either may occur without the other. Certain personality changes have been noted in cases of narcolepsy. Depression is exceptional, but irritability and argumentativeness, poor memory and poor concentration are common. The following case is typical.

Case 1.—A woman, aged 30, training to be a teacher, while on holiday at the seaside in July, 1929, suddenly developed attacks of uncontrollable sleep and weakness of the legs. She would sleep on a chair, in tramcars, in shops and on the seafront; she was also emotionally upset and would readily burst into tears. After 2 weeks both kinds of attack had passed off, but on returning to work she could not attend to the lectures and in 1930 was advised to give up the idea of becoming a teacher. During this time, her menstrual function, previously regular, became irregular and painful and remained so till 1938. There was no history of influenza or other acute illness and no reason to suspect a previous attack of encephalitis. In 1931 she started to train as a nurse; apart from being easily tired, she was well. In 1932 the narcoleptic attacks recurred. She slept during meals, in writing letters, on buses and in her lectures. At first by a great mental effort and by hurrying about, she could avert the attacks, but soon they became irresistible and could not be denied. If she was left alone the sleep attacks would last about a quarter of an hour, but gross stimulation with a pin would successfully shorten an attack. The attacks were frequent and dreamless yet she slept and dreamed normally at night. She awoke clear unless awakened forcibly, when she tended to be irritable and would yawn a lot. In 1934 the cataplectic attacks recurred. "My legs would suddenly feel weak especially if I was angry or amused. Both hands felt weak and I would often spill cups of tea. I never fell down and it was all over in a second." Narcolepsy and cataplexy occurred independently of each other, the latter being usually induced by laughter. She had no other symptoms and no pathological signs. Treatment by ephedrine had no effect in 1934. In 1938 a temporary improvement followed the use of Benzedrine and she improved still more on caffein in 1939. By this time, however, she was obviously beginning to improve and in 1940 the cataplectic attacks had completely disappeared while she was still taking caffein 5 gr. daily. She still complains of paræsthesia over the facial muscles but she had only three attacks of narcolepsy in the last year.

The sudden onset in this case was curious. There was nothing in her past or her family history to explain it; she was normally of a placid disposition and only showed irritability if forcibly awakened. Her powers of concentration are still not good, but she is a capable nurse and is now attending maternity cases in hospital. Similar cases have been reported (Adie 1926, Kinnier Wilson 1928, Daniels 1934).

TRAUMATIC CASES

In the case of an injury to the head followed by narcolepsy, damage to the third ventricle and hypothalamus might be expected. Cases of traumatic narcolepsy with cataplexy have been reported from time to time in which symptoms have developed immediately after the injury to the head or a short time later. This

is an important group and in times of war other cases may be expected; Lhermitte (1918) reported four cases after trauma with narcolepsy the main symptom. The case reported by Souques (1918) had narcolepsy with polyuria, and a case of Haenel (1929) had narcolepsy, cataplexy and mental changes. Daniels (1932), Singer (1917), Pollock (1930), Kahler (1921) and Redlich (1917) have also reported cases. In Adie's first group of 20 cases, trauma is not mentioned as a possible ætiological factor, although in 2 of the cases an accident had been experienced; one had a minor blow on the head at age of 8, and the other, a man of 48, had symptoms following a blow on the head with an umbrella. Of Kinnier Wilson's 4 cases, 1 gave a history of an accident to the head with severe concussion two years before the symptoms began.

CASE 2.—A girl of 14. In June, 1937, a heavy piece of lead fell from a skylight on to the top of her head. She was dazed, but continued work all day despite severe headache. She did not vomit and had no diplopia. Next day she returned to work, but fell off her bicycle and she was sent home. She was off work for several weeks with severe headache and was very irritable. In November, 1937, she developed attacks of weakness of the legs occurring without warning and causing her to fall; she was able to get up at once. These occurred three or four times a week. In June, 1939, she was admitted to hospital; no evidence of gross pathology was found on full neurological and X-ray examination. Two years after the accident she developed attacks of irresistible sleep, coming on at any time, even when eating and occurring several times a day. They only lasted a few minutes and the sleep was always dreamless; her sleep at night was normal, but usually disturbed by dreams. A year after the accident she had developed an excessive appetite, and polydipsia, but states there was no polyuria. Menstruation, regular before the accident, has been irregular ever since. Until the accident, she was happy, lively, and rather a tomboy type; afterwards she was irritable, less sociable, morose, aloof, restless, lacked enthusiasm and had constant headaches. In April, 1940, at the age of 17 she married, but minor symptoms persist and she is irritable with her husband.

This case was seen by Mr. Harvey Jackson who confirmed a lesion in the hypothalamic region. It illustrates many of the symptoms of a third ventricular syndrome—narcolepsy, cataplexy, menstrual irregularity and polydipsia, bulimia and personality changes. There is no increase of weight, no diplopia, no polyuria. Improvement has been steady; narcoleptic attacks have not been present for some months and the cataplectic attacks have also disappeared. She is still altered in personality and her menstruation is irregular.

CASE 3.—A girl of 16, an electrical tester. In January, 1937, a 2 lb. insulator fell on her head over the frontal region. She was severely dazed and vomited; she was taken home and immediately fell asleep, being difficult to rouse after some hours. Next morning she returned to work, but has no memory of this, and was sent home by the management as she was obviously unfit. The headache persisted and she was troubled by diplopia, pains in the left ear and the left side of the face. She remained in bed 14 weeks, being treated for concussion. During this time she had attacks of uncontrollable drowsiness. In her sleep she would snore loudly, a thing she had not done before, but she was not always unconscious, since she could often hear but could not answer. Perhaps the snore was an attempt to articulate. On getting up, she would have attacks of sleep in the cinema, during meals, when reading and even on holiday at Blackpool. In some of the attacks she would talk a lot and sing, and was very difficult to rouse even for meals. Two weeks after the accident, after heavy vomiting, she had two "fits" on one day, in which she was rigid all over, did not bite her tongue and had no enuresis. These attacks continued daily for a time. There was no aura. Weakness of the legs was also noticed; she would fall about and had difficulty in getting up. These attacks were not induced by any emotional disturbance, but "if I laughed I became sleepy again." Excessive appetite was noticed, but there was no polydipsia, nor polyuria nor menstrual changes. In October, 1937, she was admitted to hospital for a month. She had no fits during this time and only one attack of hypersomnia. The cerebrospinal fluid pressure was raised to 200 mm. The optic discs showed a pathological congestion with a suggestion of a recent retrobulbar neuritis, the edges being hazy and there was slight diminution in the fields of vision. Otherwise, no abnormal neurological or radiological signs were apparent. After discharge from hospital the sleep attacks continued and falls were frequent. "My knees would suddenly give way." In May, 1939, she was admitted to the National Hospital, Queen Square. The visual defect was then considered to be hysterical and was improved slightly by faradism and suggestion. She had no sleep attacks. Before the accident she was a well-nourished, happy and pleasant girl; since she has been cross and irritable and has lost 14 lb. in weight. She is improving slowly, but is still easily tired, with giddiness, headache and pain of the left side of the face for which the dental surgeon can find no cause. Her father died of an inoperable temporosphenoidal glioma.

In this case the cataplexy was independent of emotion, but laughter would cause drowsiness. There are symptoms, however, which suggest an hysterical overlay, notably the loud singing in her sleep; this symptom is also recorded by Singer (1917) in a case of traumatic narcolepsy. The so-called "fits" may also have been hysterical; they were never seen by a doctor. The narcolepsy attacks, the cataplectic weakness of the legs, the diplopia, the raised C.S.F. pressure, however, are beyond dispute. There must therefore be some organic lesion from the original contusion.

CASE 4.—A district nurse. When nursing a patient on Sept. 15, 1939, she hit the right parietal region of her head violently against an oak beam. She was momentarily dazed, but entered her car and drove away; after a short distance she suddenly vomited and had severe headache and double vision. These symptoms continued and on Sept. 17 she became unconscious and was afterwards kept in bed for a week; on getting up she felt as if she "had no legs" and could hardly stand up or walk. At Christmas she began to suffer from attacks of uncontrollable sleep which she tried to resist; the effort made her irritable and her legs gave way and she fell to the ground. The sleep attacks were dreamless, did not interfere with her normal sleep at night, and sometimes came on within an hour after getting up in the morning. She was not always unconscious, but had a feeling that her mind marked time and continued to think about the last idea in her mind before the attack. The cataplectic attacks coincided with the narcolepsy; she remembers the first attack as associated with "an inability to breathe and a feeling that someone had hit me behind the knees causing the legs to give way." The right arm and hand were also involved in these attacks, a sudden loss of grip causing her to drop articles. Early in 1940 the sleep attacks became less frequent, although yawning remained a regular symptom; if she got the desire to sleep she found it better to submit, because resistance caused irritability and foul temper. The cataplectic attacks still continue and come on if she tries to overcome the defective vision or to concentrate on mental problems. On examination a slight lateral nystagmus was found, but no changes in the optic discs; slight diminution of the field of vision on the right side and diplopia on looking upwards and to the right. No other clinical signs were found, but the skull was not radiographed or the C.S.F. tested. This case was seen also by Mr. Harvey Jackson who suggested that the symptoms were due to a lesion, probably in the form of minute hæmorrhages, near or in the third ventricle. There was no bulimia, polyuria or increase of weight. She dared not drive her car because it induced sleep.

DISCUSSION

In most cases of narcolepsy there is no history of preceding illness, no indication of tumour, as a rule no signs on full neurological examination, and the cerebrospinal fluid is usually normal. Cases of this type may be called idiopathic; but I am inclined to agree with Daniels (1934) that they probably owe their origin to an attenuated strain of the virus of encephalitis, not virulent enough to cause the defined picture so well known in 1917 and succeeding years. Levaditi (1922) was able to prove by animal inoculation that the virus of encephalitis from human cases retained its activity long after the onset of the disease. Hall (1924) suggests that the virus can lie quiescent for a long time and be reactivated from time to time. It is difficult to explain why "idiopathic" cases are on the increase; conceivably they are a late result of the epidemic encephalitis of 1917–18. Encephalitis lethargica was a new disease at that time, but there were other epidemics in the past whose nature we do not know, and in some of these disorders of sleep were

striking—for example, in the epidemic in Tübingen in 1712–13, the disease known as nona in Italy in 1889–90, and Dubini's electric chorea in Italy in 1846. The number of cases in which narcolepsy can be associated with a definite encephalitis are relatively few. The usual sequel of encephalitis is parkinsonism. Adie (1926) in his series of 20 cases mentions 2 patients in whom narcolepsy and cataplexy followed encephalitis lethargica, one a boy of 17 and one a man of 20. Pollock (1930) reports the case of a girl who after an attack of encephalitis lethargica developed narcolepsy with sudden attacks, associated with laughter, of muscular hypotonus causing her to fall to the ground.

Disturbances of sleep occur in organic diseases of the brain, other than encephalitis. Pette (1923) found an area of softening in the tegmentum, between the substantia nigra and the aqueduct, in a man who lay asleep for three months prior to his death. Luksch (1924) reported a case of infective endocarditis complicated by continuous sleep for a fortnight before death, and found at necropsy an embolic abscess in the grey matter of the caudal part of the third ventricle and in the wall of the aqueduct. Soca (1900) reported the case of a girl of 18 with prolonged sleep where a tumour was found penetrating into the third ventricle and Righetti (1903) has reported a similar case. Jefferson and Harvey Jackson (1939) have reported the effects of a series of tumours and summarised the symptoms of third ventricular syndrome. In narcolepsy it may safely be assumed that the lesion, whatever it may be, involves this region, and that trauma affecting that part of the brain is capable of producing any of the symptoms, including narcolepsy, cataplexy, polydipsia, bulimia, personality changes and disturbances of the menstrual cycle. In war-time, when skull injuries will be common, traumatic cases are likely to occur. And it is also worth nothing that the recognition of narcolepsy in non-traumatic cases may save an occasional soldier from punishment if found asleep at his post.

The prognosis is uncertain in all cases, but the chances of recovery are probably greater in the traumatic than in the encephalitic variety. Treatment is unsatisfactory. Some patients improve on ephedrine, benzedrine or caffeine. Daniels found that one patient improved after encephalography, but this has not given constant results in other cases. The absence of physical signs and the tendency to laugh and sing in the attacks (as illustrated in one of my cases) has caused some observers to suspect a hysterical basis for narcolepsy, but the symptoms cannot be evoked by suggestion and no permanent effect has been produced by psychotherapy or psycho-analysis. Gillespie (1927) has reported on a case of cataplexy (without narcolepsy) as having improved with modern psychotherapy, but the results were not lasting.

SUMMARY

Narcolepsy is a symptom complex, not a disease. In the absence of tumour or other gross pathology, narcoleptic symptoms are often the result of a localised mild encephalitis due to an attenuated form of the virus. Most cases give no history of such an acute illness, but narcolepsy and cataplexy may occur in the course of, or following, an attack of epidemic encephalitis.

Trauma to the skull may be expected to cause similar effects if damage is localised in the region of the hypothalamus and the third ventricle. Three cases are described in which it is fair to assume that the accident to the skull was the responsible factor.

Such cases are organic, and not, as still described in some textbooks, hysterical. Symptoms produced by suggestion may be superadded, as they may in any organic disease, and may be removed by superficial psychotherapy. There is no case yet on record where the whole picture has been altered or improved materially by psychotherapy even by deep analysis.

I am indebted for the notes of cases to Dr. Bruce MacLean, Dr. J. A. Davenport and Dr. C. H. Young.

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ACTION OF ESERINE AND PROSTIGMIN ON EPILEPTIC CEREBRAL DISCHARGES*

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EPILEPTIC attacks are accompanied by outbursts of cortical electrical activity which can easily be recognised by electroencephalography (Gibbs, Lennox and Gibbs 1936). These outbursts are sharply delimited and are made up of a rhythmic pattern of waves whose form varies with the type of epilepsy. Their size and duration have a direct relationship to the severity of the clinical attacks but short outbursts with similar wave forms are often seen without any clinical accompaniment. These small attacks disturb the rhythm of cerebral electrical activity as seen in the electroencephalogram (E.E.G.) but are not large enough to interfere with consciousness or to produce any clinical concomitant. They have therefore been called subclinical or "larval" attacks (Gibbs, Gibbs and Lennox 1937). These subclinical attacks may occur at short intervals even though the clinical fits are infrequent. This is particularly the case in petit mal, where outbursts of a characteristic type are seen (fig. 1). The ratio of subclinical to clinical attacks varies greatly from patient to patient but in any one subject it is fairly constant. Thus the anticonvulsant effect of a drug can be assessed by observing the amount of epileptic activity occurring in a few minutes in the E.E.G. record, and the study of this activity provides an experimental method for the study of epilepsy.

These subclinical epileptic attacks have been used by Gibbs, Lennox and Gibbs (1940) as a measure with which to investigate the effect of alterations in blood gases, blood pH and blood-sugar (Gibbs, Gibbs and Lennox 1939) on the incidence of epilepsy. These workers found that petit-mal activity is readily induced by a fall in blood-sugar or by an alteration of the acid-base balance to the alkaline side. Such an alteration in acid-base balance can be conveniently caused by overbreathing and it has been found that hyperventilation in cases of petit mal is usually followed in a few seconds by a subclinical attack. This procedure is useful for diagnostic purposes and it has been used in the present study in the following manner.

Coöperative patients were asked to overbreathe at a fixed rate, with the same respiratory excursion and for the same length of time every 10 or 15 minutes. The amount of epileptic activity resulting was assessed by measuring the time on the E.E.G. record taken up by characteristic abnormal wave forms (fig. 1). The effect of various drugs on the amount of epileptic activity resulting from a known precipitating cause could then be observed. For instance a record was obtained from a subject with petit mal who overbreathed for a fixed

* Presented to the Physiological Society in Cambridge, Dec. 19, 1940.

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period every 15 minutes for one hour. Then eserine was given, and records were obtained under identical conditions every 15 min. for the next two hours to determine the effect of the drug.

The method was used to observe the effect of anticholinesterases in these epileptic outbursts, because there has recently been increasing interest in the effect of cholinergic substances on the activity of the central nervous system. Schweitzer, Stedman and Wright (1939) have reported changes in the motor activity of the spinal cord after introducing anticholinesterases into the spinal theca, and Miller (1937), Bremer (1938), and Miller, Stavraky and Woonton (1940) have reported changes in cerebral electrical activity after the introduction of eserine, acetylcholine and atropine into the cortex. More recently McKail, Obrador and Wilson (1941) have found striking alterations in the responses to electrical stimulation of the motor cortex after these substances have been injected into the carotid artery.

All this work on cerebral activity has been based on open experiments in animals. The cortical electrical discharges of the epileptic offer an opportunity to carry this work further by making observations on human subjects, and it is possible that any result obtained might be applied to the study of the ætiology of epilepsy. This paper describes the method used and the results obtained with eserine and Prostigmin.

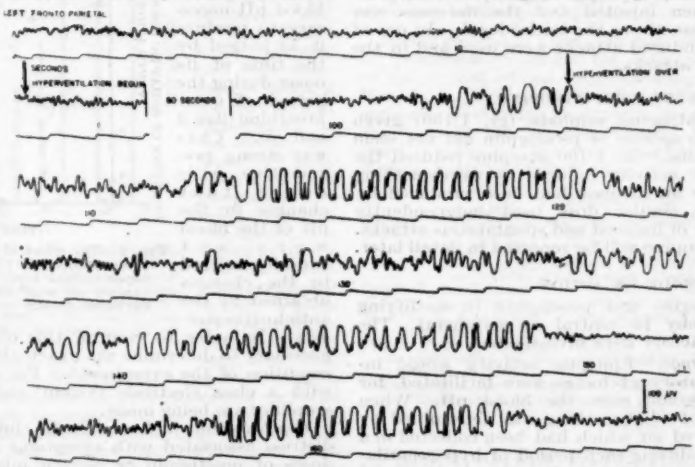

FIG. 1—A continuous electroencephalogram from the left hemisphere of a patient with petit-mal epilepsy. The record reads from left to right, and from above downwards. Time is in seconds. Overbreathing for 100 sec. produced a small outburst of large waves with a frequency of two a second. This was followed in 8 sec. by alternating spikes and waves characteristic of petit mal. There were two further outbursts before the record returned to normal. The total time occupied by these epileptic discharges after similar periods of overbreathing was used to determine the effect of eserine and prostigmin on petit mal.

EXPERIMENTAL METHOD

Epileptic subjects and normal controls were used. A pair of electrodes were sealed to the scalp with collodion simplex, contact being made with Cambridge electrode jelly. The electrodes were connected to a condenser-coupled amplifier which motivated an ink-writing oscillograph from which continuous records were obtained on moving paper (fig. 1). One electrode was placed at the hair line over the frontal lobe and the other over the parieto-occipital region, so that they recorded changes taking place over a large area of cortex. Spontaneous epileptic attacks—even the more frequent subclinical ones—are usually so capricious in their appearance that they are not reliable for experimental purposes. Data were therefore obtained from attacks induced by raising the pH of the blood by hyperventilation (Gibbs, Gibbs and Lennox 1939). The patient was shown how to hyperventilate and it was found that steady overbreathing for 100 seconds was enough to produce an epileptic outburst of a petit-mal type in the subjects used. The subjects were instructed to hyperventilate for 100 sec. every 15–20 min. and to try to maintain the same depth of overbreathing each time. The experimental procedure calls for considerable intelligent coöperation on the part of the subject and obviously requires careful selection of suitable patients.

The respiratory rate was recorded while the expired air was collected in a Douglas bag and measured. The experiments were begun about 3 hours after a meal, thus ensuring a fairly stable blood-sugar level; the subjects sat comfortably in a quiet room and repeated records were taken for periods up to 3 hours after an injection had been given. The duration of the induced epileptic discharge was measured during and after each period of hyperventilation. Fig. 1 shows the response of an epileptic subject's E.E.G. to overbreathing. Several epileptic outbursts often occurred after hyperventilation and they were occasionally associated with momentary changes in consciousness and behaviour. The sum of their duration in seconds was taken to represent the total epileptic activity resulting from the preceding hyperventilation and this factor was plotted graphically after each experiment (see figs. 2–5).

RESULTS WITH ESERINE

Epilepsy induced by overbreathing.—Physostigmine salicylate (eserine) B.D.H. was injected subcutaneously in doses of 1–2 mg. in nine experiments on five subjects. In seven this dose did not give rise to any symptoms, and in six of these seven there was a diminution in the epileptic activity after hyperventilation. This improvement began between 15 and 30 min. after the injection and lasted for a further 50 min. In two instances the improvement was maintained for more than 100 min. after the injection, at which time the experiment was discontinued. The epileptic activity ceased completely in four experiments (fig. 2). This prolonged remission in the epileptic outbursts will be referred to again later. Examples of the changes obtained in the E.E.G. are represented graphically in figs. 2 and 3. In one instance there was no change in the epileptic activity occurring after overbreathing, and in the remaining experiment there was an increase in the epileptic activity after injection of 1·0 mg. of eserine, although the subject had on two previous occasions shown a great improvement after 1·5 mg. In the two instances where symptoms followed the injections there was an increase in the epileptic activity after overbreathing. In one of these, injection of 1·5 mg. of eserine was followed by an increase in the duration of epileptic discharges which began 20 min. after the injection and passed off 60 min. later. The subject then had slight abdominal discomfort and nausea. The remaining subject received 3·0 mg. and in 30 min. became pale and cold, with sweating, salivation, nausea, colic and vomiting. There was an increase in the epileptic activity which was maximal 70 min. after the injection (fig. 4).

Spontaneous epilepsy.—An attempt was made to alter the incidence or duration of spontaneous epileptic discharges with eserine in six experiments on four subjects. A dose varying between 1 and 2 mg. was given on four occasions without any subsequent symptoms. There was a reduction in the amount of spontaneous epilepsy in two and in the other two no significant change could be seen. In two subjects who experienced some nausea and abdominal discomfort without vomiting there was a definite increase in the epileptic activity. One man received 3·5 mg., and the other, a small boy of thirteen, 1·5 mg. of eserine subcutaneously.

RESULTS WITH PROSTIGMIN

Epilepsy induced by overbreathing.—Prostigmin was given on eight occasions to four subjects. In seven experiments 1·5 mg. was injected subcutaneously and in one 2 mg. was given. In all the experiments there was a significant increase in the epileptic activity seen

in the E.E.G. In three cases there were no symptoms, but in five the characteristic symptoms of nausea and abdominal discomfort arose, requiring subcutaneous injection of atropine sulphate in four cases. A typical result is shown in fig. 5.

Spontaneous epilepsy.—Prostigmin was given subcutaneously in doses of 0·6 mg. and 1·5 mg. in two subjects. In both there was an increase in the incidence and duration of the spontaneous attacks. One had nausea and abdominal discomfort, the other was symptom-free.

RESULTS WITH ESERINE FOLLOWED BY PROSTIGMIN

In two experiments an injection of 1·5 mg. of eserine produced a decrease in epileptic activity. 1·5 mg. of prostigmin was then injected and the decrease was altered to an increase above the initial level. In one of these experiments induced attacks were used and in the other spontaneous attacks.

RESULTS WITH ATROPINE

Small doses of atropine sulphate (gr. 1/150) given simultaneously with eserine or prostigmin did not seem to modify the results. Gr. 1/100 atropine reduced the amount of epileptic activity induced by overbreathing when injected after an increase had been produced by prostigmin, and a similar dose used independently reduced the number of induced and spontaneous attacks. The results with atropine will be reported in detail later.

MODE OF ACTION

The effect of eserine and prostigmin in modifying epileptic activity may be central or peripheral. The following possible factors were investigated.

Respiratory exchange.—Epileptic activity would increase if the respiratory exchange were facilitated, for washing out CO_2 would raise the blood pH. When possible the depth of overbreathing was determined by measuring the expired air which had been collected in a Douglas bag system during each period of hyperventilation. There was no significant alteration in the total volume of gaseous exchange during 100 sec. hyperventilation in thirteen experiments with large and small doses of eserine and prostigmin (see figs. 4 and 5). The individual variations were no greater than those obtained in a series of control experiments without drugs. On the other hand, it was surprising how uniformly a coöperative subject could maintain a steady level of hyperventilation in repeated experiments.

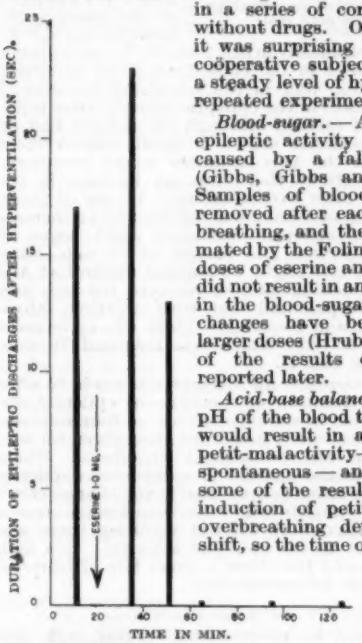

FIG. 2—The effect of 1 mg. of eserine on the number of seconds of petit-mal activity induced by repeated standard periods of overbreathing in the subject whose record is shown in fig. 1.

Blood-sugar.—An increase in epileptic activity might have been caused by a fall in blood-sugar (Gibbs, Gibbs and Lennox 1939). Samples of blood were therefore removed after each period of overbreathing, and the blood-sugar estimated by the Folin-Wu method. The doses of eserine and prostigmin used did not result in any constant change in the blood-sugar levels, although changes have been produced by larger doses (Hrubetz 1937). Details of the results obtained will be reported later.

Acid-base balance.—A shift in the pH of the blood to the alkaline side would result in an increase in the petit-mal activity—both induced and spontaneous—and might explain some of the results obtained. The induction of petit-mal epilepsy by overbreathing depends on such a shift, so the time of onset of epileptic activity after beginning overbreathing was measured in each case and was found to be remarkably constant in each experiment. For instance, in one subject epileptic discharges were seen $54 \pm 4·5$ sec. after beginning over-breathing, while in another $79 \pm 6·5$ sec. were necessary, while the total gaseous exchange per min. was 1·1 cu. ft. in the first and 1·5 cu. ft. in the second. There seemed to be no relationship between the amount of epileptic activity induced by overbreathing and the change in blood pH necessary to produce it, as judged by the time of its onset during the period of overbreathing (figs. 3 and 5). This was strong presumptive evidence that changes in the pH of the blood were not causally related to the changes obtained by the anticholinesterases. In order to confirm this observation it will be necessary to determine the exact pH of the blood in the condition of the experiment. For this, determinations with a glass electrode system and a direct coupled amplifier are being made.

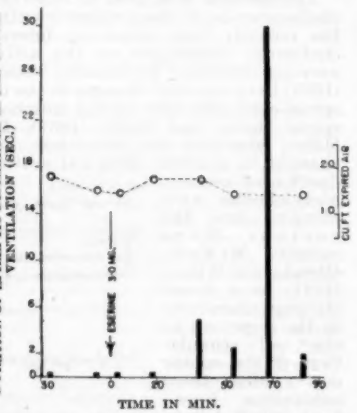

FIG. 4—The effect of 3 mg. of eserine on the same subject as in fig. 2, under identical experimental conditions. The volume of expired air represents the total respiratory exchange during 100 sec. of overbreathing.

Psychological factors.—From clinical experience the distress associated with symptoms resulting from large doses of prostigmin or eserine might be expected to cause an increase in the incidence of fits. Careful note was kept of the patient's state and his symptoms were noted as they arose. A decrease in epileptic activity was never observed when such symptoms were present, but an increase occurred with prostigmin in four experiments in the absence of any clinical sequelæ of the injection. In the other cases symptoms were associated with the increase in epileptic activity.

RESULTS IN CONTROLS

Eserine and prostigmin did not produce any abnormal response in the E.E.G. after overbreathing in three normal subjects. The experimental procedure was repeated without any drugs in five of the patients and there was no constant change in the degree of epileptic abnormality after standard hyperventilation. In three cases there was a gradual increase in the amount of abnormality with each repeated period of overbreathing. The changes already described were independent of this effect, but it is possible that in the one subject who showed an increase in epileptic activity after 1·0 mg. of

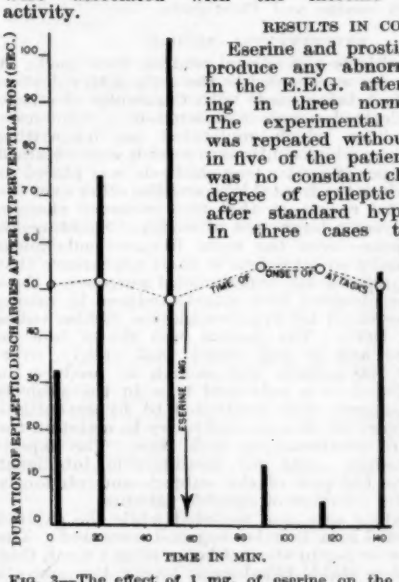

FIG. 3—The effect of 1 mg. of eserine on the number of seconds of petit-mal activity induced by repeated standard periods of overbreathing. In this subject repeated overbreathing caused a steady increase in the epileptic activity, in the absence of any drugs.

eserine the dose was too small to modify this increment.

DISCUSSION

The opposite effect of small doses of eserine and prostigmin on the cortical electrical disturbances associated with epilepsy is most striking. It may depend on a different mode of action within the central nervous system, for Schweitzer, Stedman and Wright (1939) have pointed out that eserine is a tertiary ammonium base which is fat soluble and therefore may enter the parenchymal cells, whereas prostigmin is a quaternary ammonium base and being water soluble exerts its maximal effect outside the cell, possibly at the synapse. The first is a central convulsant, but petit mal, with which this paper is concerned, may well be the result of simple depression of nervous activity, so that the present results are not necessarily at variance with those of Schweitzer and Wright (1937) who found that eserine caused an increase in spinal activity while prostigmin depressed it. The present results may, on the other hand, depend on the peripheral changes produced by eserine and prostigmin, but this is unlikely since both have a similar peripheral parasympatheticomimetic action. Although changes in blood-sugar have been reported (Hrubetz 1937), the doses used in these experiments were apparently not large enough to produce any significant change. Petit mal can readily be produced by raising the blood pH, but the amount of overbreathing necessary to produce attacks was constant in these experiments, although the alterations in epileptic activity were considerable. This suggests that a change in the blood pH was not the cause of the results obtained. Further and more precise observation of the blood pH will be necessary to establish this observation. A point in favour of a causal relationship between the blood pH and the increase in epileptic activity with prostigmin and eserine might be the association of nausea and vomiting with the changes seen in the E.E.G. Vomiting results in a depletion of HCl with a shift of acid from blood to stomach and consequent temporary alkalosis. Such a condition would favour the production of petit-mal epilepsy, but several of the subjects in this investigation showed increased epileptic activity without any symptoms, so that the change is probably unimportant.

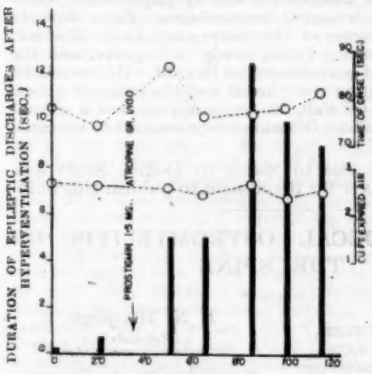

FIG. 5—The effect of 1·5 mg. of prostigmin with gr. 1/100 atropine subcutaneously on petit-mal activity induced by repeated standard periods of overbreathing (100 sec.). The volume of air expired during the overbreathing and the time of onset of the attacks has no constant relationship to the amount of epileptic activity.

It is so far impossible to localise the site of action of the anticholinesterases in petit-mal epilepsy, but it has been shown that several peripheral effects of the substances are not causally related to the changes observed. There is chemical and experimental support for the suggestion that the action is a central one (Schweitzer, Stedman and Wright 1939) but more data are required to establish this hypothesis.

In view of the beneficial effects of small doses of eserine, clinical trial has been undertaken in a few selected cases. Some have had striking temporary remissions, and a larger group is being studied. At the most the results justify a further study of the rôle played by the cholinergic mechanism in the initiation or maintenance of epileptic cerebral activity.

SUMMARY

In six out of seven experiments carried out on epileptic patients eserine in doses not large enough to cause symptoms reduced the petit-mal activity seen in the E.E.G. With large doses the epileptic activity was increased.

Prostigmin invariably caused an increase in the petit-mal activity in ten experiments. The effect of eserine was reversed by prostigmin and the effect of prostigmin and of large doses of eserine was abolished by atropine.

Other factors known to precipitate petit-mal epilepsy were controlled and the results suggested that the effect may be a central one, but further work is being undertaken to attempt to establish the mode of action.

A study of the effects of other autonomic drugs on the electrical activity of the cerebral cortex offers a new approach to the investigation of the ætiology of epilepsy.

We are grateful to Lieut.-Colonel G. O. Chambers, R.A.M.C., for permission to publish the data included in this paper, to the medical officers for coöperating in the work, and to Miss J. K. Reynell, B.Sc., for technical assistance. The apparatus used in the experiments has been lent to the Royal Air Force by the National Hospital, Queen Square, and a grant towards the expenses incurred has been made by the Medical Research Council.

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MENINGITIS WITH NASAL DISEASE
DUE TO *STREP. VIRIDANS*

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THE following case seems sufficiently rare, both in its incidence and its fortunate ending, to be worth recording.

A boy, aged 9 years, had had a transient pharyngeal infection, from which he had recovered quickly, and apparently completely. The illness here recorded started suddenly 3 weeks later, with headache, vomiting, and rise of temperature to 103° F. When I first saw him, about 36 hours after the onset, he was hardly conscious, restless, and resentful of any interference. Considerable head retraction was present, with Kernig and Brudzinski signs positive. There was distinct puffiness below the left eye, and the movements of the eyeball were limited. He was removed to the York City Fever Hospital, where a lumbar puncture was done. The cerebrospinal fluid was under considerable pressure, turbid, and contained numerous pus cells and gram-positive cocci, which culture showed to be streptococci of the viridans type. Treatment was begun with 1 g. of sodium sulphapyridine intramuscularly followed by 1 g. of sulphapyridine every four hours by mouth. On account of the eye signs, a radiogram was taken of the nasal sinuses, and this indicated an infection of both maxillary antra. As the patient continued to be desperately ill, Mr. R. Thomas, on the evening after admission, punctured both antra and drained the left, which contained pus, opened and drained the left frontal sinus, on the floor of which a little pus was found, and exenterated the left ethmoid, which was necrotic. At the same time similar amounts of Soluseptasine were substituted for the sulphapyridine. Cultures from the infected sinuses were made, and a *Streptococcus viridans* again found.

During the next two days the boy's condition steadily improved, and this improvement continued. On the third day after operation a lumbar puncture showed fluid with 200 cells per c.mm., mostly lymphocytes; cultures sterile. After 18 g. in all of the sulphonamides had been given, a leucopenia was found (4500 white cells per c.mm.). The drug was stopped and 5 c.cm. of pentnucleotide was given, and in five days the white count had risen to 8700. Eighteen days after admission the patient was well enough to be discharged.

Before the sulphonamides were used, the fatality in cases of this kind approached 100%. Hagerup (1936) reported two recoveries in meningitis following ethmoiditis, but the symptoms in these cases were comparatively slight. Appelbaum (1938), however, reports one case of recovery from severe meningitis caused by the *Strep. viridans* following ethmoidal infection, and treated with sulphonamides and spinal drainage without operation. The time to operate, if operation is attempted, appears to be when localisation has occurred, as it had in this case. Hagerup advises operation when a pleocytosis of the cerebrospinal fluid has appeared. Bowers (1939) advises operation if signs of meningeal irritation are present. Goodyear (1939) advises against operation until there is evidence of pus formation in the sinuses affected.

In the case here described, it seems unlikely that the patient would have survived without the sulphonamides, though this class of drug is not generally supposed to have a dramatic effect on an infection with non-hæmolytic streptococci. Of the two compounds used, soluseptasine appeared to be the more effective.

My thanks are due to Mr. Thomas, Dr. S. G. Platts, Dr. J. N. F. Fergusson, and to Dr. N. J. M. Hession, for their help with this case.

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HODGKIN'S DISEASE IN THE BLADDER

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In several hundred cases of Hodgkin's disease investigated and treated at St. Bartholomew's Hospital, this particular manifestation in the bladder has not been seen before, and it seems to be the first case diagnosed in life and successfully treated. Lebowich [1] recorded a case in which intermittent attacks of hæmaturia and frequency were the first symptoms; the presence of pyelonephritis and renal failure obscured the diagnosis, no treatment was given, and the patient died 20 months from the onset; autopsy showed a dense lymphadenomatous infiltration of the bladder, rectum and recto-vesical pouch, and there were deposits in all the abdominal organs; enlargement of the cervical glands had been noticed during life, but had been taken to be metastases from a malignant process. Lebowich found only 5 published cases of Hodgkin's disease in which involvement of the bladder had been recorded.

In June, 1940, a man of 32, feeling absolutely well, presented himself before a medical board for service in the R.A.F., but was rejected because he had "lumps in the neck." A month later he noticed a slight but irritating rash on the lower limbs, and in August he began to suffer from frequency of micturition. By the beginning of September the frequency had become hourly by day and night, and was accompanied by acute pain and a yellow discharge at the end of the act. The urge to micturate became so frequent that it amounted to virtual incontinence, and after passing a few drops of blood on one occasion he came to hospital and was admitted on Sept. 21.

He was pale and looked ill, partly owing to loss of sleep from the pain and frequency. The right cervical and right axillary lymph-glands were greatly enlarged and were typical of lymphadenoma, the diagnosis being confirmed as lymphadenoma verum by biopsy; a radiogram of the chest showed enlargement of the mediastinal glands also. Apart from the rash on the lower limbs and deep tenderness in the suprapubic region there were no other physical signs; the temperature was normal, but the pulse-rate was raised to 110. The white-cell count was 19,600 per c.mm., and there was an eosinophil count of 980 per c.mm. (5%). The urine was sterile on culture, and no tubercle bacilli were found. X-ray therapy to the thorax and neck was begun on Oct. 28, and, on the supposition that there was a subacute non-specific cystitis which had not yielded to the usual measures, doses of 50 r were given to the bladder at 5-day intervals. The enlarged glands rapidly decreased in size, but the pain and frequency persisted. On Nov. 14 cystoscopy by Mr. Kenneth Walker showed the mucous membrane of the bladder to be studded with greyish-yellow nodules the size of grape-seeds; there were also a few submucosal hæmorrhages. From Nov. 18 onwards ten daily doses of 140 r were given to the bladder; the pain and frequency began slowly to improve, and the man was discharged convalescent on Dec. 16. By the middle of January micturition was normal and the enlarged glands had disappeared. On Feb. 13 cystoscopy showed a normal bladder, and the patient felt completely restored to his usual good health.

My thanks are due to Major R. Bodley Scott and Mr. Kenneth Walker for permission to publish this note.

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STAPHYLOCOCCAL OSTEOMYELITIS OF THE SPINE

BY

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STAPHYLOCOCCAL osteomyelitis of the spine has been fully described by Wilenski (1934), Kulowski (1936) and Turner (1938). It may be divided into three main clinical types. The first as a rule occurs in children or young adults and is characterised by a sudden onset with the symptoms of a severe bacteræmia. The local signs are often subordinated to those of the general infection and the diagnosis is usually obscure, often only being made at necropsy. Treatment in these cases is directed to combating the blood-stream infection, the patient rarely living long enough for the local treatment to become a problem. During the last twenty years at the London Hospital 13 cases of this type were admitted and every one of them died. Necropsy was performed on all of them and death was shown in every case to be due to bacteræmia with abscesses in the lungs and other viscera. A correct diagnosis was made during life in only 4 instances, the remainder being labelled retention of urine, appendicitis, acute abdomen and cellulitis of the neck; 3 were treated as pneumonia.

The second type has been ably described by Stammers (1938). The onset is sudden with general malaise and pain in the back. An abscess rapidly forms, which may either point externally or form an intraspinal extradural collection, in which case signs of pressure on the cord become evident and meningitis may supervene later with fatal results. Drainage of the abscess after laminectomy is probably the best line of treatment in these cases. Stammers reported 3, of whom 1 died. We found 2 fatal cases in the London Hospital records, both of whom died from a terminal meningitis.

The third type is sufficiently rare to make it worth while publishing the following case, especially in view of the fact that the patient had the benefit of treatment with sulphathiazole.

CASE-HISTORY

On Dec. 15, 1939, a man aged 53 was admitted with the following history. Three months before admission he had complained of general malaise with pains all over the body. His wife had noticed that he developed an angular deformity of his spine. He had had persistent fever and had lost 3 st. in weight. Recently he had complained of a band-like pain around his chest. He was an ill, wasted man, weighing 7 st. 6 lb. Temperature 100° F.; pulse-rate 108; respirations 24. There was an angular deformity at the level of the 5th thoracic vertebra. His fingers were slightly clubbed. The mediastinum was not displaced. There was diminution of movement, dullness and absent breath sounds at the right base. A provisional diagnosis of carcinoma of the lung with secondary deposits in the spine was made. Radiography showed complete collapse of the 5th and partial collapse of the 6th dorsal vertebræ. There was an opacity spreading downwards and outwards from this region, which was assumed to be a retropleural abscess.

On Dec. 19 the abscess was needled and thick pus found. Culture: *Staphylococcus aureus*; no tubercle bacilli. Blood count: red cells 4,650,000; Hb. 82%; white cells 6000 (polymorphs 71%). On Dec. 30 the abscess was aspirated again, and 40 c.cm. of pus withdrawn. Culture as before. A diagnosis of staphylococcal osteomyelitis of the spine was made and the patient was immobilised in a plaster bed. By March 11, 1940, his temperature was still swinging and he was given a course of sulphapyridine, 25 g.; blood-sulphapyridine levels were: first day, 8·2 mg.; second day, 11·65 mg.; third day, 5·82 mg. per 100 c.cm. No clinical improvement was noted. On March 1 a course of sulphathiazole was given. A single dose of 2 g. was followed by 1 g. 4-hourly until a total of 25 g. had been given; blood-sulphathiazole levels were: first day, 4·71 mg.; second day, 11·35 mg. per 100 c.cm. After this course he continued to show steady improvement. On April 23 he was transferred to Claybury Emergency Hospital under the care of Mr. L. C. Oliver. On Aug. 1 he was removed from the plaster bed and put into a plaster jacket, which he wore for 6 weeks. By Nov. 21 his general health was good and he weighed 9 st. 13 lb. Radiography showed the abscess to have been absorbed and that there was bony fusion between the 5th and 6th dorsal vertebræ. His weights during treatment were: Dec. 28, 1939, 7 st. 4 lb.; Jan. 10, 1940, 7 st. 5 lb.; March 9, 7 st. 9 lb.; Nov. 21, 9 st. 13 lb. The erythrocyte-sedimentation rates (Westergren) were: Jan. 2, 104; Jan. 12, 61; March 15, 75; April 8, 50; Nov. 21, 7.

This type is most often seen in adults. The onset is more gradual and the symptoms are from the first referred to the affected vertebra. Unless the organism is isolated from an abscess or from some pyæmic focus elsewhere in the body these cases may be diagnosed as tuberculosis of the spine. Some have been treated by bone-grafting with excellent results. Two cases of this type have been treated at the London Hospital in the last two decades. The first had a bone-graft performed for supposed tuberculous infection, but later developed staphylococcal abscesses in other bones; the second was treated by aspiration of a spinal abscess with immobilisation of the spine. Both recovered. We have presented this case to illustrate the difficulties in diagnosis in this type of spinal infection and also to show that chemotherapy may play a part in the treatment. Improvement certainly followed the administration of sulphathiazole but there was no striking difference in the clinical course of the disease, as compared with that seen in similar cases. Blood-cultures were not done, because the patient did not show the clinical picture of septicæmia. Up to the present we have not had the opportunity of treating a fulminating case with chemotherapy and as far as we know no such case has been published since sulphathiazole came into use.

We would like to thank Dr. W. R. Thrower for help and advice; and Messrs. May and Baker for supplying sulphathiazole (Thiazamide).

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PLASTERS WITHOUT TEARS.—The slab technique for application of plaster-of-paris casts, using standard patterns, saves both time and mess, and Messrs. T. J. Smith and Nephew Ltd. have done useful service in summarising present practice in a booklet "Preparation of Plaster Casts" and in offering a set of patterns to users of their wide "Cellona" material. The technique described in the booklet agrees with that recommended by Trueta, G. R. Girdlestone (*Lancet*, 1940, 2, 287) and W. S. Creer (*Ibid*, Jan. 4, 1941, p. 9). On page 4 it would have been well to have explained the reason for leaving a narrow gap between adjacent edges of slabs. This allows the plaster to expand if the limb swells after its application, and is thus a valuable safeguard against the danger of constriction of the circulation. The shoulder-spica pattern could be improved by cutting out a semicircle for the neck. Nursing of the patient in plaster is perhaps outside the scope of this brochure, but though the success of plaster work depends on good patterns and good application it depends almost as much on watchful care and expert nursing after the plaster is applied.

Medical Societies

ROYAL SOCIETY OF MEDICINE

AT a meeting of the Section of Epidemiology and State Medicine on March 28, with Dr. WILLIAM BUTLER in the chair, a discussion on

Pulmonary Tuberculosis in the Royal Navy

was opened by Surgeon Rear-Admiral S. F. DUDLEY, F.R.S. He described how up to 1900 the incidence of tuberculosis in the Navy shared in the decline of this disease in the general population. Since 1900 in spite of the continued fall for the country as a whole the case-incidence in the Navy has remained at about 2 per 1000, although the greatest efforts have been made to ameliorate the environment by better ventilation, dust-extraction and improved diet, and to improve diagnosis by periodic overhauls of the men. This apparently critical morbidity is about twice that in the Army and R.A.F. and is higher than in comparable sections of the civilian population although the Navy is a selected body of men. Among the officers the morbidity is less than half that among the ratings, and ratings who become officers share in the reduction, while those who remain on the lower deck maintain their old higher rate. These findings suggest that an important factor in preventing improvement in the Navy is overcrowding—i.e., allotment of space for work and for sleeping accommodation. Little further reduction in overcrowding can be expected—there is a tendency for an increase of the ratio of machinery to men in the development of modern warships. The problem before the Navy is therefore to detect latent tuberculosis before the patient becomes ill and coughs up tubercle bacilli. For this purpose ordinary physical examinations have been proved useless and new methods must be found which are cheap and rapid. The whole naval force must be examined periodically and not just on entry as recruits. This is feasible since tuberculosis appears to be contracted on the ships themselves—the whole ship's company form the home-contacts of any case—and the men change their ships every two to three years, at which time they could be conveniently examined at one of the three naval depots.

Miniature radiography, Admiral Dudley said, offers the method of choice and it was decided, largely through the initiative of Surgeon Commander A. Robinson Thomas, to X ray the whole naval force on every change of commission. The first miniature-radiography department was opened under Surgeon Commander W. G. C. Fitzpatrick at Chatham and the statistics of the first 18,000 men examined are presented. Over 100 suspects were found, but, following the principle of X raying with a full-size film all suspected cases, this number was reduced considerably. In all, 69 cases were sent to hospital and 47 of these were finally diagnosed as active tuberculosis and invalided out, making a final case-incidence of 2 per 1000. Half the active cases had positive sputum which is an improvement on the 90% usually found in the Navy by the ordinary methods of diagnosis. It is hoped that the percentage of sputum-negative cases will increase. Most of the men with active disease had no complaints. The incidence of suspected active tuberculosis on the miniature films was considerably higher for the older men than for the younger. Summing up, Admiral Dudley pointed out the advantage of the method both to the patient and to the naval community. He expected the case-incidence to increase at first owing to the number of unrecognised cases already present. The final efficacy will partly depend on how far tuberculosis in the adult is due to fresh infections and how far to the breakdown of resistance. It will also depend on what is the minimal dose required to produce disease in susceptible subjects.

Surgeon Commander FITZPATRICK, who organised the Chatham department, described its routine. A Stanley Cox unit is used with 35 mm. film, 100 mA power, tube-screen distance of 36 in. and an exposure time of 0·3–0·6 sec. The cost per case is less than 1*d.* and 200 cases can be examined in an hour.

Surgeon Commander THOMAS pointed out that the method is as useful for the community as a whole as for the Navy and may reduce the high costs in life and money

of tuberculosis. He told how one large firm claimed to have saved considerable sums by X raying its staff and their relatives periodically. The miniature method, while perhaps not quite as good as full-size X rays, is superior to screening.

Sir WILSON JAMESON said that mass radiography offers the only method of the future for improving early diagnosis but he pointed out that difficulties may be encountered in persuading men to accept the sharp drop in standard of living between their wages and national health-insurance benefit.

The discussion was continued by Dr. S. COCHRANE SHANKS who stressed the importance of speed in the technique of miniature radiography for large groups, and the CHAIRMAN warned the meeting that we must expect a halt in the improvement of tuberculosis in the country for some time to come owing to the reduced standard of living and the housing shortage which he feared would accompany and follow the war.

Reviews of Books

Man on his Nature

The Gifford Lectures. By Sir CHARLES SHERRINGTON, O.M. London: Cambridge University Press. Pp. 413. 21*s*.

MODERN use of the experimental method in science dates from the Renaissance, yet since inductive reasoning gave place to the more workaday hobby of collecting and studying facts the mind of man has made an astonishing journey. Sir Charles Sherrington establishes the contrast by setting out first the scientific standpoint of Jean Fernel, the sixteenth century physician to Henry II of France, who represents the best opinion of his day, and compares his conclusions (not his intelligence or judgment) with those we can form today on the basis of greatly increased factual knowledge. Where Fernel distinguished living and non-living we can speak of energy composed ultimately of identical units; in our world such units are linked to form systems which achieve a temporary equilibrium. In the living cell Sherrington shows us this equilibrium as a foaming, stirring physicochemical state constantly changing and as constantly restoring itself. In non-living matter the difference is of degree not of kind; the physicochemical equilibrium is still impermanent and unstable, but its changes are less violent and swift; the table is less ephemeral than the professor who leans on it. The living is thus no longer cleanly distinguishable from the non-living; in a world composed of energy we find ourselves able to study different manifestations of energy, that is all. Our ancestry, too, is humbler than Fernel supposed, and the origins of life lie not in a moment of sublime creation but in the physicochemical adventures at surfaces of vapours, fluids and solids in a cooling world; though here we are extending knowledge to the length of a reasonable guess. Many things which Fernel, lacking data, misinterpreted we can now measure and check as manifestations of energy. One still eludes us—mind. Conscious thought is not energy. It provokes no measurable changes in any part of us, and we even lack any sense-organ by which to observe it. We can hazard no guess on the nature of mind because here we still lack data. We cannot even say certainly at what level in the animal scale it appears; some observers claim that even the one-celled animal is capable of learning by experience. Sherrington would have us accept energy and mind as a working biological unity, although we cannot describe the how of that unity.

"An individual organism with recognisable mind is a space-time system which the energy concept because of that mind fails to cover fully. In such an instance the two concepts prove to be complemental . . . our being is a unity whose behaviour we can follow only by including the two concepts and treating them as having 'contact utile' with each other." On this basis we can study them, experience shows, fairly. Conscious mind is of recent origin, a humble affair as yet: "man is awake and does and sees," but drowsily still. The nature of conscious mind and the relation of mind and brain are of acute practical importance to the neurologist and the psychiatrist. Until they are established conclusions in both fields must be tentative and empiric, and science expects caution when theories are formulated or announced. We can at least be sure that brain and mind have developed together. "Between the individual human mind and the individual human forebrain considered in time and space there is 100 per cent. correlation."

"Man on his Nature" is too rich in knowledge, too profoundly stirring to the wits to be discussed relevantly in a few brief paragraphs. No single message emerges from a book which like a ripe carpus is crammed with new thoughts in seed. But one magnificent certainty is pressed home; it is of the nature of living things to grow, willy-nilly. Our circumstances have made us, and at last have made conscious mind. If it were not useful to our survival we should not have it: and we cannot stop it becoming. We can look with hope towards the mind of man to come as being suprahuman (as we know human) and thus, perhaps, more keenly aware of the "values" which conscious mind discovers. "His oncoming had been an outstripping of other minds. His dominance pillars on mind. Will that ensure its future?"

Microscopic Anatomy of Vertebrates

(2nd ed.) By JAMES I. KENDALL, D.Sc., assistant professor in biology in the City College, New York. London: Henry Kimpton. Pp. 342. 17*s*. 6*d*.

FEW handbooks on comparative histology are available for the student and this work provides a sound and pleasantly presented introduction to the subject. The different systems are taken in separate chapters after the manner of standard textbooks of histology, and in each the main anatomical and histological variations characteristic of the different classes of vertebrates are described. It is a pity that all sections could not be as fully worked out as those on the integument and the digestive system, which are excellently done. Unfortunately a textbook of this type has self-imposed limitations and the curious-minded must seek elsewhere for the fuller details—Dr. Kendall has provided a bibliography for this purpose. A section on technique gives useful hints on fixation and section-cutting.

Synopsis of Materia Medica, Toxicology and Pharmacology

By F. R. DAVISON, M.B., M.Sc., assistant professor of pharmacology, University of Arkansas. London: Henry Kimpton. Pp. 633. 25*s*.

BELIEVING that pharmacology is "an integral part of medicine," Dr. Davison deals with it from the clinical viewpoint. A therapeutic classification is adopted. To the practitioner and senior student this will be an advantage; but for the junior student the arrangement has the drawback that information concerning many important drugs (e.g. mercury) is scattered through various sections. But the beginner will welcome Dr. Davison's introductory chapters on general principles of pharmacology, pharmaceutical preparations and processes, and prescription-writing. The work is synoptic only in the sense that an attempt has been made to eliminate superfluous matter and the author has tried to keep an eye on the utility of the drugs included; there is a vast amount of information in its 600 pages of small type. Phraseology is concise and the imperative mood is often used to achieve brevity, but historical notes serve to leaven the somewhat terse and prosaic presentation. Students will appreciate the prescriptions incorporated in the therapeutic sections. Many important chapters are prefaced by short physiological surveys, and Dr. Davison's special knowledge of toxicology is reflected in his skilful correlation of this subject with the pharmacological and therapeutical parts of the text. For the sake of the English reader, in future editions the lists of official drugs and preparations might perhaps include a selection from the British Pharmacopœia.

Black's Medical Dictionary

(16th ed.) By J. D. COMRIE, M.D., F.R.C.P.E. London: A. and C. Black. Pp. 1006. 20*s*.

THIS "Special War Edition," as it is called, has been thoroughly revised. Among much other fresh material it contains notes on the sulphanilamides and a supplement on the management of air-raid casualties including those caused by gas. Notes on each subject are necessarily short, but they are simple and expressed in non-technical language. Apparently at whim derivations are given in some cases but not in others.

THE LANCET

LONDON: SATURDAY, APRIL 12, 1941

TUBERCULOSIS AND WAR

AFTER the war of 1914–18 a well-known professor of medicine in Vienna remarked that it had been a colossal experiment in metabolism. Much the same might have been said about it in relation to tuberculosis. In both cases it was uncontrolled experiment vitiated by almost every kind of variable factor. It is too early yet to determine what effect the present totalitarian war will have on the tuberculosis mortality of Europe, but there is good reason to face what facts we have. Prof. E. L. COLLIS [1] describes how the resisting power of the population to tuberculosis was weakened by food shortage in the last war, especially in middle Europe. Mortality from all forms of tuberculosis had steadily diminished in the second half of last century, the decline being greatest at the beginning of life, smaller in early adult life, and least in more advanced life. During the years immediately preceding the war the rapid fall in early life continued, but it slowed down in the age-group 20–25, and quickened in the group 45–55. Then came the war, and the mortality steadily rose from 1914 to 1918. COLLIS considers that the disturbance of the male population by military service was so great that it is impossible to draw conclusions from figures relating to them and confines his remarks to the statistics for females. Analysing the figures in age-groups, he points out that no change occurred in the first 5 years of life, but that, thereafter, until about the age 30, a steady percentage increase in mortality became manifest, growing as year succeeded year until 1918. From about 30 onwards to old age there was no increase. GREENWOOD has shown that this rise among females was directly proportional to their employment as munition workers; it did not happen in districts where munitions were not being made. Lastly in the age-group showing the war rise in mortality the rate of fall lagged in the years which followed the war; this lag was visible until the generation born after the war grew old enough to replace all members of that age-group. But the 1918 figures were disturbed by another factor—the influenza epidemic. This great pandemic followed the usual course, taking its heaviest toll of the older generation, until the last 8 days of June, when a high mortality suddenly appeared in the young adults—that is, in the age-groups upon which tuberculosis had been hammering harder and harder during the previous 4 years of war. This sudden alteration in mortality was unique. COLLIS quotes from a Ministry of Health report, "It may be doubted whether so sudden and so complete a change of age-incidence can be paralleled in the history of any other disease—yet all the weight of medical testimony goes to show that the influenza of 1918 was essentially the same as that of former years." He ends with the query, what is it reasonable to expect as 1939 passes to 194– ?

Dr. FREDERICK HEAF and Dr. LLOYD RUSBY note that on Sept. 3, 1939, the tuberculosis service became seriously disorganised because of the anticipated blitzkrieg. Tuberculosis officers were chiefly concerned with A.R.P., many sanatoriums were converted into class 1 and 2 war hospitals, operative treatment was temporarily brought to a standstill (in some cases even before a many-staged procedure had been completed), care-committee work largely ceased, the open-air schools were closed and the children billeted in the country, and hundreds of tuberculous persons—many of them in an infective state—were discharged from institutions to their homes. It is easy to be wise after the event; the best that can be said of an intolerable situation is that in our preoccupation with war and its new untold possibilities in the air we forgot our peace-time responsibilities to a large and infective class of the population. At the end of 1939 there were 70,000 sputum-positive cases on the dispensary registers, including 10,000 in London alone. In due course the position was taken in hand by the appointment of a standing advisory committee by the Ministry of Health, and 6000 beds were released. Meanwhile the dispensary services began to re-establish their organisation; by the summer of 1940 a "fair degree of normality" existed again. Then came the threat of invasion and the period of intensified bombing. There were many sanatorium beds in that restricted strip of land, 20 miles wide from Edinburgh to Bournemouth, which constituted the dangerous area, and a plan for evacuation had to be worked out, beginning with helpless stretcher cases and gradually extending to the ambulant patients. The bombing of London and the dispersal of known infective cases to the shelters produced yet more anxieties, and to those who know the difficulties which even in peace-time surround the chronic ambulant sputum-positive case these anxieties will occasion no surprise. Lastly there was the ebbing and flowing tide of evacuation from vulnerable areas with its attendant risks of the billeting of the tuberculous patient on healthy homes. What the future holds in store for the tuberculous patient, especially if rationing becomes more severe, none can say. HEAF and RUSBY take the view that the man living at home and unfit for work is going to feel more acutely than his fellows the stringency of rationing. But we started this war with certain advantages over August, 1914. Our tuberculosis mortality was lower, the number of available beds was greater, and the dispensary system much better equipped and operating throughout the country.

1. *Tubercle*, 1940, **21**, supplement p. 1.

ASSAY OF ANALGESICS

IN the mind of the experienced practitioner certain pains are equated to particular analgesics: he would not offer aspirin to the patient "climbing the walls" with ureteric colic, nor resort to morphine to comfort the fat woman with fibrositis. Having selected the appropriate drug, the amount ordered is determined by a number of considerations, including the range recommended by the pharmacopœial commissioners, the size of the patient and the severity of the pain. The principles of posology have been worked out in considerable detail by pharmacologists, and for such remedies as diuretics, gastric antacids and antiseptics it is often possible to obtain independent evidence that these rules are accurate enough for clinical

2. *Ibid*, p. 171.

purposes. The position with analgesics is different, for until recently we have had no means of measuring pain, and this has delayed the advent of accurate knowledge, particularly with reference to optimum dosage. Thus it has perhaps been too readily assumed that within toxicological limits analgesic potency is directly proportional to the size of the dose. Recent work seems to show that this simple linear conception of the relationship is erroneous and that an asymptote represents the true state of affairs.

WOLFF, HARDY and GOODELL of Cornell have extended their work on the measurement of pain and the pain threshold-raising action of the opiates [1] by making similar investigations on the commoner non-opiate analgesics, including aspirin, phenacetin and amidopyrin.[2] As before, pain was produced by a 1000-watt lamp, controlled by a rheostat, focused on the subject's forehead. They find that the minimal effective dose of aspirin as an analgesic is 0·9 mg. per kg./body-weight (about gr. 1 for a patient of 60 kilos). The smallest amount that produces the greatest threshold-raising effect is 0·3 g. (gr. 5). If the dose is increased beyond gr. 5 the rate of excretion rises so rapidly that the higher doses give comparatively little prolongation of analgesic action. Thus aspirin gr. 5 produced analgesia for 4½ hours, and six times this dose prolonged the effect by little more than an hour. Various combinations of analgesics were studied, including the well-known A.P.C. powder, and it was found that the threshold-raising effect of these compound powders was no greater than that of their most effective ingredient. As far as analgesics are concerned, then, the time-honoured custom of prescribing basis and adjuvans seems to be seriously threatened. On the other hand, it was noted that the sedative and hypnotic side-effects of these combinations of drugs were summative. Ethyl alcohol in doses of 30–60 c.cm. (½–1 oz.) has a threshold-raising effect rather greater than that of aspirin; here again, the larger doses do not increase the intensity of the effect though their action is more prolonged. This remarkable advantage of alcohol over aspirin revealed by the time-action curve is worthy of note by pharmacologists who, in the laboratory at any rate, have scarcely done justice to the virtues of a double whisky. The mechanism of the analgesic action of alcohol is confirmed and clarified by these investigations, for the subjects tested experienced feelings of contentment and detachment. This emotional state resembled that produced by opiates and resulted in "an ability to dissociate pain perception from the pattern of reaction to pain." In their previous researches on the opiate analgesics, these workers found that the potency of morphine and its derivatives in raising the pain threshold was considerably diminished by the presence of another uniform painful stimulus—produced by a sphygmomanometer cuff kept on the arm at 220 mm. Hg for 40 min. By contrast, the antagonism between pain and threshold-raising action is slight or absent in the case of aspirin, phenacetin, acetanilide and ethyl alcohol. Amidopyrin, phenacetin and acetanilide are often thought to be more potent analgesics than aspirin, but the impression is not confirmed by this investigation; apparently there is little to choose between them, whether we consider threshold-raising power or duration of analgesia. There seems therefore to be little justification for using these drugs, for it cannot be claimed that any of them have additional therapeutic effects which make them indispensable. On the contrary, their toxicity is such that the use of acetanilide no longer receives official sanction and amidopyrin has been largely removed from proprietary remedies because of its liability to lead to agranulocytosis. Even phenacetin, though harmless in therapeutic doses, should be employed cautiously in view of its relationship to acetanilide. Compared with these compounds, aspirin has only low toxicity, and in the light of the present findings it may reasonably be regarded as the best universal analgesic that has yet been evolved.

This work reveals more clearly than ever the gap that exists between the synthetic analgesics and morphine. An analgesic as effective as morphine but lacking the unpleasant side-effects and complications which often attend its prolonged use has yet to be found. Some proprietary remedies purport to fulfil these requirements, but most of these claims are discredited by the most casual examination of the list of ingredients, and the others can now be tested by the technique of WOLFF and his colleagues. New analgesics are urgently needed, and this accurate method of assessing their potency should stimulate collaboration between the clinical pharmacologist and the synthetic chemist. These new methods for the quantitative investigation of pain may also find applications in other fields of research. Thus the observation made at Cornell that ergotamine tartrate has no effect on the pain threshold, though a negative finding, is none the less valuable as a contribution to the elucidation of the action of this drug in migraine. Again, in the realm of psychiatry, there is plenty of scope for the study of pain and analgesia among patients suffering from psychoneurosis.

1. Hardy, J. D., Wolff, H. G. and Goodell, H. *J. clin. Invest.* 1940, **19**, 649; see *Lancet*, 1940, **2**, 167.
2. *J. clin. Invest.* January, 1941, p. 63.

HYPEREMESIS GRAVIDARUM

OF cases of excessive vomiting in pregnancy only a proportion can fairly be classed as hyperemesis, and some strict clinical criterion would be a help in assessing changes in incidence and prognosis. Quoting the figures for the last seventeen years from the Royal Infirmary, Edinburgh, FAHMY [1] notes that in the first seven years there were 22 deaths in 206 cases, while in the last ten years there were 17 deaths in 603 cases, a fall in fatality from 10·6 to 2·8%. From these figures it seems that with readier admission of these cases to hospital severe hyperemesis is decreasing. FAHMY discounts an element of neurosis in the ætiology for the following reasons: most women desire their pregnancy, yet 40–50% suffer from some degree of vomiting; whereas many unwanted pregnancies are not associated with vomiting at all, nor is the condition relatively more common in pregnancy in unmarried women. Moreover, the average pregnant woman is not predisposed to neurosis, and in a considerable number of cases vomiting precedes certain knowledge of conception. Neurosis may exaggerate but cannot initiate the vomiting. Equally flimsy is the evidence for the toxic theory, since many of the toxic manifestations are the effect rather than the cause of

1. Fahmy, E. C. *Edinb. med. J.* 1940, **42**, 822.

hyperemesis; nor is the theory of syncytial or endometrial embolism more convincing, since sickness is by no means a constant feature in cases of hydatidiform mole or chorion epithelioma, where the absorption of tissue cells from the uterus should be greater than in the normally pregnant. So-called toxic vomiting in most cases is the end-result of a long period of sickness that has been labelled neurotic in the first instance. Any vomiting from whatever cause if unrelieved for a sufficient time results in dehydration, metabolic changes and liver damage. It would therefore be well if the label "neurotic hyperemesis" were abolished, and if this was done many cases would never become toxic. Many a woman with hyperemesis has, owing to her physician's perseverance in his diagnosis and treatment of the case as one of neurosis, insensibly lapsed into a severe and irreparable state of toxicity. If all cases of severe vomiting were primarily treated as toxic and potentially dangerous valuable time would not be lost.

Since most cases of hyperemesis develop from persistence or exaggeration of the physiological early morning sickness or nausea of pregnancy, it behoves us to eliminate this early and thus make a prophylactic attack on hyperemesis. Simple remedies of diet and discipline will often suffice. The severer class of case demands immediate and more drastic treatment; it can be recognised by the dehydration, raised pulse-rate, depletion of urinary output, dry, furred tongue, sore mouth and sordes about the lips, ketosis, anxious facies, icterus, albuminuria, loss of weight, lowered blood-pressure, insomnia and mental symptoms. Any or several of these are grave phenomena and may suddenly develop in a woman who has merely been vomiting more persistently than usual. FAHMY relies on three essentials in the treatment of these severe cases: rest, fluids and bowel lavage. Rest he obtains by hospital or institutional treatment and the exhibition of bromides or Luminal; he does not advise morphine or opium, since they increase the dryness of mouth and tongue so distressing in these cases. Fluids must be pushed to the point of adequate hydration by the rectal or intravenous route, and it is important to be sparing with salt. To overstep the salt requirements in a dehydrated patient will only upset the intercellular metabolism and may lead to œdema of the lungs and embarrassment of an already toxic myocardium. Probably the best prescription for prolonged and heavy intravenous therapy is 5% glucose in 1:5 normal saline as advocated by AVERY JONES and NAUNTON MORGAN.[2] Colonic lavage must be used intelligently and sparingly in the severer cases, since its empirical advantages may well be offset unfavourably by the disturbance that an over-enthusiastic cleansing of the bowel causes to an already exhausted patient. The question of when and if to terminate the pregnancy can best be answered by the clinical judgment of the obstetrician. If, after a short period of trial of rest and hydration (at most a few days), the patient is no better, it is justifiable to empty the uterus. If done betimes the operation is relatively safe; later it is not only harmful but useless.

On Monday afternoon Sir CHARLES WILSON was elected to succeed Sir Robert Hutchison as president of the Royal College of Physicians of London.

2. Jones, F. A. and Morgan, C. N. *Lancet*, 1939, **2**, 611.

Annotations

ST. THOMAS'S IN THE COUNTRY

APRIL 16 promises to become one of the most important dates in the history of St. Thomas's Hospital, for on that day its branch hospital in Surrey will come into existence. Although to the casual passer-by the structure on the Albert Embankment may not seem unduly bomb-shaken, its utility as an efficient hospital has been so reduced that the governors, having been informed that the damage to property, equipment and drugs lies in the region of £1,000,000, have decided that the only way in which the traditions and service of the hospital can be maintained is by opening an annexe in the country. For this purpose they have been fortunate in obtaining a hutted hospital which was erected by the military authorities. It is proposed to begin with 72 beds; this number will be quickly increased to 200 and after some time to 360 beds. The reason for this final delay is the necessity for using some of the huts, until more can be erected, for the accommodation of the medical, nursing and lay staff. From the beginning the new hospital will have all the facilities of a modern hospital, with laboratories and X-ray department. An ambulance service has been organised both in Surrey and in London to bring patients to the new hospital. All the members of the honorary staff who are not in one of the Services will have beds in the new hospital and, as our advertisement columns have shown recently, arrangements have been made for registrars and house-men. The curriculum of the medical school is being altered to come into line with the new hospital and the first batch of clerks and dressers are starting there at the beginning of the summer term. This move does not mean that the hospital in Lambeth Palace Road is being deserted. Ever since the evacuation of the hospital in September last year full outpatient facilities have been maintained and these will be continued on almost the same lines as in peace-time—incidentally, the outpatient attendances have been steadily mounting during the winter and spring. In addition, the present two wards will be maintained for civilian acute cases, whether medical or surgical, and air-raid casualties, as well as the small obstetrical unit which has been kept fully occupied ever since the hospital was evacuated.

In 1862, on the occasion of the opening of the temporary premises for St. Thomas's in Surrey Gardens, we expressed ourselves as follows:

> The gardens, extending over more than twelve acres, have been carefully restored, and will present a feature novel amongst metropolitan hospitals. The student will here, in modern academic groves, pursue his studies in a little oasis of quiet and beauty, including every appliance for health, comfort, and relaxation, situated in the centre of an enormous population, such as can alone require a large hospital and supply the elements of medical, surgical, and obstetrical education. The patients themselves will enjoy the advantages of free air, repose, pleasant prospects, and exercise to an extent unknown in other London hospitals. The situation and capabilities of the place are felt to be so excellent that the eccentric idea of building St. Thomas's on some distant rural spot must be abandoned.

Alas, what seemed so desirable a site in 1862 is not ideal now, and many of us are wondering whether the present move indicates at long last a break in the peculiar English tradition that patients should be nursed in the midst of some of our most squalid and over-populated districts rather than in the open country.

SYMPTOMS OF THREADWORMS

THE finding of threadworms in the stools of children is often too readily accepted as an explanation of vague disturbances in health. To get over this difficulty in their investigation into the symptomatology of threadworm infection T. H. Weller and C. W. Sorenson[1] chose

1. *New Engl. J. Med.* Jan. 23, 1941, p. 143.

387 consecutive outpatients at the Children's Hospital, Boston, none of whom had been brought to hospital because of a primary complaint of threadworms. An arbitrary list of eleven of the signs and symptoms most often ascribed to threadworm infection was selected for study. These fell into three groups. First came gastro-intestinal symptoms, including nausea and vomiting, vague intestinal pain, diarrhœa, loss of weight and loss of appetite. Next came certain local, perinæal symptoms —anal pruritus, anal skin lesions, and vaginitis and vulvitis. Finally there were three nervous symptoms—night restlessness, enuresis and masturbation. Each of the children was subjected to a special examination by the "N.I.H. swab," an anal swab consisting of a portion of Cellophane folded on a small glass rod and widely used for the accurate determination of threadworm infection in the United States. A group of 118 inpatient children were also examined by the anal swab. Of the 505 children, 97 (19%) were found to have threadworms, more girls being infected than boys. Of the outpatient group, in whom the special study of symptomatology was made, 72 (19%) had threadworms and 315 (81%) were free. It was found by comparing these two groups that children with threadworms complained of gastro-intestinal symptoms no more often than the uninfected children, with the exception of a slightly greater percentage showing loss of appetite—a finding at variance with the popular idea that "worms" produce an abnormally large appetite. The incidence of vulvitis and nocturnal restlessness was the same in both groups of children. The remaining symptoms—anal pruritus, anal skin lesions, enuresis and masturbation—were slightly commoner in the positive group but in no case was the variation statistically significant. This study does not, of course, give a fair picture of the symptomatology of threadworm infection since it deliberately excludes children who were known to have worms in the stools. But it does reveal the relatively frequent occurrence of latent or what may be termed "subclinical" infection. Of the 72 positive-swab children 64% had no gastro-intestinal symptoms, 80% had no perinæal symptoms and 58% had no nervous symptoms. Actually 36% had none of the eleven symptoms chosen for inquiry. These findings must not be interpreted as meaning that threadworm infection causes no symptoms, but in the past the symptoms attributed to threadworms have been so vague that they could probably be elicited from a large proportion of the normal population. More study is needed to tell us why some patients have symptoms and some not. Meanwhile it is a disquieting thought that nearly 1 in 5 of the white children attending the Boston Children's Hospital are harbouring these worms without their parents' knowledge.

THE SIGNIFICANCE OF CERVICAL METAPLASIA

THE very early diagnosis of cervical cancer offers a problem which has often perplexed the pathologist and confounded the surgeon. At one time it was not uncommon to regard the cervix as precancerous, or in an early stage of actual cancer, if it was the seat of epithelial metaplasia, but experience of the action of gonadal hormones on the uterus and vagina in animals has changed our opinions. Carmichael and Jeaffreson [1] point out that in the cervix of the healthy nulliparous woman the stratified epithelium of the vagina abruptly gives place at the margin of the external os uteri to the columnar-celled lining of the cervical canal, and there is no intermingling of one type of epithelium with the other. Often, however, a stratified, non-secreting epithelium, sometimes surmounted by mucus-containing cells, is found within the cervical canal; it may be in isolated patches and occasionally extends deeply into the cervical glands, thus in some degree simulating early cancer. Carmichael and Jeaffreson have studied the condition by a histological survey of 400 human cervices. They find no evidence to support the old contention that the stratified epithelium has spread by a direct ingrowth from the vaginal face of the cervix; its presence in the cervical canal is in fact the result of a local metaplasia. Among the cases which provided the material for their paper endocervical metaplasia was present in 35% of women under fifty and in 50% of those over fifty; otherwise the influence of age was slight. No evidence was found suggesting that inflammation plays an important part in causing the lesions, nor that the changes are precancerous. They suggest that the condition may be induced by sex hormones acting in conjunction with local causes. Such a view is in accord with experimental results obtained with sex hormones in animals; these have shown that œstrogens cause stratification of the vaginal epithelium, and—if given in sufficient quantity—of the cervical endothelium too. Susceptibility to this reaction is innate in the cells, and is graded in degree so that an amount of hormone enough to cause stratification in the vagina will not necessarily cause a like change in the cervical epithelium, though larger doses, if given long enough, will have this effect. The boundaries of these gradients of susceptibility are not always precise; large doses of an œstrogen may provoke reactions which are not always well-defined anatomically or evenly distributed. Moreover, some hormones reinforce each other and others are antagonistic so that a given lesion cannot be attributed to a deficiency or excess of any particular hormone until the quantities of other effective hormones present at the same time have been estimated. Finally, in the spayed rat mere irritation of the vagina, as caused, for example, by daily scraping, favours the appearance of epithelial stratification. With such an experimental background the observations and microphotographs of Carmichael and Jeaffreson seem to agree.

1. Carmichael, R. and Jeaffreson, B. L. *J. Path. Bact.* March, 1941, p. 173.

CHEMOTHERAPY IN AMERICA

THE American National Research Council evidently takes a realistic view of its functions. Two of its committees—one on chemotherapeutic and other agents (chairman, Perrin H. Long) and the other on infectious diseases (chairman, Francis G. Blake)—have jointly issued a circular letter [1] on chemotherapy for infectious diseases and other infections. Although they admit that it is impracticable, except in a broad way, to delineate therapy for persons suffering from various infections, they give specific advice about choice and dosage of sulphonamide drug and the indications for the use of specific antisera in the following diseases: hæmolytic streptococcal infections (tonsillitis, otitis media, cellulitis, erysipelas, septicæmia, &c.), scarlet fever and its complications, meningococcal and other purulent forms of meningitis, primary and secondary pneumonia, gas-bacillus infections and staphylococcal infections. The various toxic manifestations from the three commonly used drugs—sulphanilamide, sulphapyridine and sulphathiazole—are listed and advice given about their prevention and treatment. Not all the recommendations about use and dosage of drug would find general acceptance here. For example, despite the risk of relapse, it is not customary to continue dosage in streptococcal or meningococcal infections at the rate of 6 g. daily for 5–7 days after the temperature has subsided, as advised in this letter. On the other hand, no instructions are given to the practitioner about when to stop the drug in cases which do not respond. Opinion here is divided about the value of sulphanilamide in tonsillitis, and its use, as recommended, in 0·5 g. doses four times daily for the period of isolation to prevent the septic complications of scarlet fever is not likely to be beneficial in fever hospital practice, where French [2]

1. Circular Letter No. 81. *J. Amer. med. Ass.* Feb. 8, 1941, p. 513.
2. French, J. O. *J. Hyg., Camb.* 1939, **39**, 581.

has shown that much larger doses for 28 days had no effect on the kind, incidence or duration of scarlatinal complications. Better results are obtained if the drug is used curatively at the onset of septic complications, and toxic reactions are thereby greatly diminished. Sulphanilamide is recommended for meningococcal meningitis, whereas present practice here is to use, particularly with severe infections, sulphathiazole or sulphapyridine by mouth, or intravenously if the patient cannot swallow. Contrary to their statement, the soluble sodium salts of these drugs can safely be given intravenously along with saline or glucose, although, with the tendency to precipitate out, it is less safe to add them to plasma or blood. Sulphathiazole is recommended as the treatment of choice for lobar pneumonia; chemotherapy is much less effective in secondary bronchopneumonia. Specific antipneumococcal serum is recommended as additional treatment only in certain special circumstances—a remarkable volte face in America. Surprisingly, scarlatinal antitoxin is to be given in septic scarlet fever, although American clinicians claim much better results from immuno-transfusions in such cases. Antitoxin is not mentioned in the treatment of staphylococcal infections. Although serum is given pride of place as supporting treatment in the prevention and treatment of gas gangrene, the statement that sulphanilamide given prophylactically almost always eliminates the possibility of gas-bacillus infection is without any reliable clinical backing.

These differences of viewpoint serve only to emphasise the wide field covered in this circular letter and to show the value of such practical advice as it contains. A pamphlet on similar lines drawn up by, say, a committee of the fevers group of the Society of Medical Officers of Health and circulated to all infectious-diseases hospitals would fill a widely felt need.

PERITONEAL FLUID AS AN AID TO DIAGNOSIS

FACED with an acute abdomen, the surgeon of today is still without real help from any of the newer sciences and he must rely almost entirely on his clinical sense. What may be called the laboratory lag makes the clinical pathologist inaccessible, and, even if the radiologist can sometimes help, the decision to act—be it in typhoid fever, appendicitis or in intestinal obstruction—must be an immediate one. A method to make laboratory aid less tardy is proposed by Steinberg,[1] who has studied the pathological peritoneal fluids in over 150 cases of inflammation or irritation. Much is already known from experiments about the cytological response of the peritoneum to bacterial and other irritants, but Steinberg is concerned with peritoneal exudates as a guide to the diagnosis and prognosis of intra-abdominal conditions. Peritoneal fluids were removed by abdominal puncture, at operation or at autopsy shortly after death, and records were kept of the numbers and type of organisms and cells, of cell structure, of the number of leucocytes with ingested bacteria, and of the presence of extraneous substances in the fluids in different conditions and at various stages of their development. Thus the fluid in early infections of the peritoneum shows about 8% of mesothelial cells, 90% of polymorphonuclears and 0–6 bacteria free in an average oil-immersion field; while in late infections the exfoliated mesothelial cells may rise to 20%, intact polymorphs may be present only in moderate numbers, and the free bacteria may rise from 10 to uncountable numbers in a smear. Whatever the value of such tables to the skilled interpreter it is better for most of us to place trust only in the grosser features which may make diagnosis certain. The finding of a specific pathogen such as the pneumococcus in the fluid, the presence of numerous intestinal species of bacteria in appendical peritonitis, the mucinous material and fibre strands in peptic-ulcer perforation and the cholesterol crystals in bile peritonitis are of immediate help. Steinberg suggests that the fluid may be obtained from the mid-abdomen by puncture with an ordinary needle and syringe or by a special capillary pipette before operation or immediately the peritoneum is incised; and that microscopic examination of the fluid in stained smear and wet preparations should be made on the spot. The occasions on which this sort of pathological support for the surgeon may be possible are not very numerous but there are times when abdominal puncture might certainly help—for example, after operation when the decision is between distension caused by atony or by infection; or before operation, when salpingitis, appendicitis or ectopic gestation may all be under consideration. The dangers of the exploratory needle are probably not great, as those familiar with animal experiments know, and the operation has often been performed on children without unhappy complications. One point emphasised by Steinberg is that the fluid must be withdrawn from the mid-abdomen but he has yet to show that the fluid from this area adequately represents or even indicates conditions in other parts of the peritoneal cavity.

1. Steinberg, B. *J. Amer. med. Ass.* Feb. 15, 1941, p. 572.

CALCIUM AND IRON

STEPS are being taken to make good any lack of calcium that there may be in our food by the enrichment of white flour with chalk, and there is ample evidence that calcium salts supplied in this way can be utilised by man. Nutrition, however, is a complex matter, and one constituent of the diet cannot be altered without a risk of upsetting the utilisation of some if not all of the others. Recent work by Kletzien[1] and Tompsett[2] has indicated that the addition of large amounts of calcium-containing substances to the food of mice and rats interferes with the absorption of iron and reduces the iron stores of the body. This observation is interesting from two points of view. In the first place it throws some light on the complex factors regulating mineral metabolism. Tompsett suggests that calcium acting in the intestine as a base lowers the acidity of the intestinal contents and as a result lessens the solubility of iron salts and the proportion present in the divalent or ferrous state. It is held by some workers that the reaction of the intestinal contents plays a leading part in regulating the amount of mineral absorbed. At the same time it must be remembered that patients with achlorhydria do not necessarily suffer from anæmia. Hutchison,[3] indeed, has shown that the actual absorption of iron in an achlorhydric subject was not impaired. The retention of calcium itself does not appear to be significantly affected by the administration of a diet rich in alkali.[4] The question arises whether calcium exerts a specific action on absorption apart from its tendency to produce an alkaline reaction in the upper intestine. Certainly a high calcium diet greatly reduces the absorption of lead. The possibility that lime salts in large amount affect the secretory or absorptive powers of the intestinal epithelium should not be entirely disregarded, for in addition to its actions as a bone builder and regulator of neuromuscular excitability calcium seems to play an important part in controlling the distribution of water between cells and tissue fluids. Of more immediate importance is the question whether the addition of chalk to our bread will have a deleterious effect on the synthesis of hæmoglobin by limiting the absorption of iron. It would be a national disservice to exaggerate the possible dangers of this dietetic adjustment, and as has been pointed out in *Nature*[5] the maximal increase

1. Kletzien, S. W. *J. Nutrit.* 1940, **19**, 187.
2. Tompsett, S. L. *Biochem. J.* 1940, **34**, 961.
3. Hutchison, J. H. *Arch. Dis. Child.* 1937, **12**, 305.
4. Farquharson, R. F., Salter, W. T., Tibbetts, D. M. and Aub, J. C. *J. clin. Invest.* 1931, **10**, 221.
5. Feb. 22, 1941, p. 225.

in lime produced by the addition of calcium to white flour is very much less than that used by Kletzien and Tompsett in their experiments. There was an old view that excessive consumption of milk leads to anæmia, and if milk is taken to the exclusion of other foods this may well be true, not because of the high calcium content of milk but because of its very meagre content of iron. The same may apply to the abnormal diets forced on us in war-time. It will be wise, therefore, for the family doctor to make increasing use of his hæmoglobinometer just now, especially with expectant mothers and children, in whom the chances of iron deficiency are greatest.

AUTOPSIES IN RURAL PRACTICE

HIMSELF a country practitioner, Dr. W. F. Putnam [1] pleads for the routine performance of post-mortem examinations in country practice and has contrived to get permission for, and to carry out, autopsies on 34 of the 64 of his patients who died in the years 1936–39. In most cases his clinical and pathological findings tallied tolerably well, though a clinical diagnosis of "stillbirth" is not greatly amplified by a pathological diagnosis of "stillbirth"; autopsies ought to take us further than this. It is easy to be wise afterwards but it may be wondered why some at least of the conditions first discovered at autopsy were not suspected before death. It seems incredible, for example, that peritonitis due to a ruptured gall-bladder should have been completely silent. Nor should a thrombophlebitis have been missed, whereas a thoracic aneurysm might surely have been suspected and subsequently confirmed radiologically. In so far as he wants us to perform autopsies to attain greater knowledge and accuracy Putnam carries us all with him. It is only when he argues that, without the salutary cold douche of post-mortem evidence, country doctors are apt to become complacent and unconscious of their errors and limitations that some will want to join issue with him. In this country the standard of country practice is at least as high as, if not higher than, that of towns and few if any rural patients die undiagnosed for lack of necessary special investigation. One of the reasons why Putnam wants country doctors to carry out autopsies is to improve the standard of rural practice and so "eliminate the bogy of state medicine." It is difficult to follow his reasoning here. A superstition widely held among those practising in towns is that country doctors enjoy a life of arcadian leisure whereas in fact one of the many difficulties of autopsy in country practice is to find the time and the place and the cadaver all together. Post-mortem examinations conducted on a trestle-table in a freezing outhouse with a bucket of cold water as the sole amenity and the local Dogberry as assistant are toughening experiences which, though better than nothing, are not conducive to good and accurate work; where a post-mortem room, with a skilled pathologist hovering in the background is at hand, it is another pair of shoes. Might not Putnam's dreaded bogy provide us with these?

BURNS OF THE EYELIDS

How far coagulants must be held responsible for contractions following burns of the face or hands is still undecided, but the burns team of the M.R.C. war-wounds committee have left no doubt of their own opinion, by their recommendation that no coagulant of any kind should be used on the face, hands and wrist, or feet.[2] The voice of eye surgeons has been little heard in the discussions on this question, but certainly some of them maintain that eyes have been lost with tannic acid which might have been saved with other treatment. In their view coagulants applied to the lids render them rigid, immobile and contracted, their protective function to the eye is lost, the cornea dries and ulcerates from exposure, and perforation and panophthalmitis will ultimately destroy the eye. Whatever his personal opinions, no surgeon is likely to feel certain enough of them to ignore this warning, so that for the rest of the war coagulants are likely to be discarded in the treatment of burns involving the eyelids. Careful diagnosis of the depth and extent of such burns is essential. First-degree burns merely require cleansing with saline or sodium bicarbonate, the application of saline packs and observation. Those of second degree should be treated in the same way, with careful excision of all tags of dead epithelium and vesicles. During observation it may become evident that some areas are in fact third degree. In most burns of the eyelids the lid margins remain intact. This is of great advantage in that it allows tarsorrhaphy to be performed, a procedure of vital importance for the protection of the cornea and the prevention of ectropion during healing or after the application of a Thiersch graft. In third-degree burns cleansing, excision of all devitalised tissue and tarsorrhaphy are followed by the application of a Thiersch or Wolfe graft, held securely in place by suturing the edges of the graft to adjacent skin and covering this with tulle gras and a piece of stent moulded to shape and held in position by sutures.

1. *New Engl. J. Med.* Feb. 20, 1941, p. 324.
2. See *Lancet*, March 29, 1941, p. 426.

ANÆSTHESIA FOR CHEST SURGERY

THE development of anæsthetic methods and technique to meet the full needs of the surgeon carrying out severe chest operations was discussed on April 4 by Dr. M. D. Nosworthy at the section of anæsthetics of the Royal Society of Medicine. He warmly advocated "controlled respiration," that system by which natural respiratory movement is suspended and the respiratory exchange is effected by rhythmic pressure on the breathing bag. The advantage to the surgeon working within the chest of having the cavity free from movement needs no emphasis; and a safe technique to provide this may be acquired by experience. Controlled respiration is obtained either by lowering the carbon-dioxide tension or by heavy depression of the respiratory centre by drugs; to obtain it Dr. Nosworthy uses cyclopropane at a percentage strength much above that considered safe in ordinary surgery. He does not consider the use of Avertin or paraldehyde permissible to repress respiration because they abolish the cough reflex for too long. For empyema and lung abscess local anæsthesia was recommended. Cough must be prevented, because it disseminates infection; for this purpose either the infected zone of the lung must be shut off from the healthy parts or else suction must be used effectively. Dr. Nosworthy believes that the surgeon is well advised to forgo the advantage he might sometimes gain from the use of diathermy for the sake of using an anæsthetic whose inflammability must not be forgotten. In civil life the subjects of severe chest surgery have generally suffered long-standing illness, often complicated by amyloid disease, and every possible step has to be taken to maintain circulatory and respiratory efficiency at the best possible level during operation. In military chest surgery the position is different, the patient being, apart from his chest injury, a first-class subject. Dr. C. Langton Hewer considered the post-operative fall in blood-pressure after cyclopropane to be due to the disturbance of metabolism produced by a sudden return from an atmosphere containing excessive oxygen.

Sir COMYNS BERKELEY has been re-elected chairman of the Central Midwives Board for the year ending March 31, 1942.

In a circular (No. 2323) addressed to local authorities and hospital boards the Minister of Health recognises the serious effect on private practice of the recruitment of practitioners of military age and suggests ways of allocating medical man-power between the civilian and military services.

Special Articles

STUDENTS IN CONFERENCE

LAST year some six hundred students attended the meeting of the National Union of Students at Leeds; this year a thousand were expected at Cambridge and over eleven hundred arrived. Many of them, using well the opportunity of war, came as hitch-hikers on cars and lorries; on April 1 they were converging on Cambridge through the rain, some as hooded figures with mackintoshes and stout shoes, rucksacks on back, and some from farther afield wearing the kilt and the skiandhu. Of this company two or three hundred were medical students, members of the British Medical Students' Association; the northern universities were well represented in this group, but members from the south were relatively scanty, those from the London medical schools being disappointingly few, though the London School of Medicine made a good showing and contributed to the executive staff. Students always make an impressive audience to their elders because they show that altruism which later experiences seldom leave undulled. They have the generosity which might build a new world, if the world into which they are about to step was not geared to destroy that very quality. This may account for the impatience with which one or two of their lecturers summed up at the end of discussions; it is never very comfortable to meet one's former ideals face to face after twenty years of compromise. The students were idealistic, yes; impractical, yes—even at times woolly. But they have, it seems, a keen social conscience, an anxiety to learn preventive medicine, to change those industrial conditions now injuring the health of their fellows and to turn medicine from a routine of patching up to something more constructive. And this great head of energy, this weight of goodwill, is only ineffective because we have arranged our society in such a way that it is not harnessed. The students are eager enough to put it into commission; nothing showed this more than their attention to Dr. H. G. STEAD, director of education at Chesterfield Technical College, Sheffield, and the way in which they quoted him in the sessions that followed. The idea which had caught them was one he introduced in speaking of the escapist device of responding "in the future" to a challenge which is immediate—the belief, for example, that by doing something to improve the education of school-children we were relieved the responsibility of doing something constructive ourselves. He suggested a concrete plan by which students might make a contribution now to the study of their times, approaching it by way of discussion of the public schools; these, he said, were established to train people for leadership at a time when political power was in the hands of the few and the main economic was agriculture. Was their function still desirable? Yes, in his view. But power had moved into more hands and the main economic was now industry. Only by drawing pupils from the whole people and by changes in the curriculum to meet the new economic could the public schools continue to fulfil the function for which they were set up. He suggested that students might form small groups to study the curriculum of any school they knew, and to find out how that curriculum came into being, what purpose it fulfilled then, whether that purpose was still valuable and if so what changes were needed to make the curriculum fulfil the same function today.

THE CURRICULUM

Perhaps in no form of education is research so much needed as in the curriculum of the medical student. Prof. F. WOOD JONES, who addressed the B.M.S.A. on the present position of medical teaching, gave his audience some excellent starting points for investigations of the kind. In the days of the private medical schools, he said, students had to know enough botany to spot plants used in the British Pharmacopœia, a smattering of zoology relating to the animals whose products appeared in the same work, and the chemistry of the drugs they used. Their study of anatomy was nearly as full as it is today, but their physiology course was trivial. When Huxley laid down the modern university curriculum in London scientists believed in uniserial evolution; as a result, the curriculum was loaded with all sorts of plants and polywogs which were dead ends of evolution and threw no light on human structure. It was topsy-turvy, indeed, to dissect a rabbit in preparation for the study of man; man was the simplest mammalian type; it would be logical to give the zoologist about to study mammals a man to dissect before he passed on to more highly modified creatures. Professor Wood Jones suggested that the first-year course might be replaced by what Americans called an orientation course—a general course in biology. This should be given by the best and most mature teacher, his business being to provide an introduction to the study of life for the man who was going to deal with living organisms. In the teaching of anatomy and physiology the study of structure must be related again to that of function. The spinal tracts and the neuromuscular mechanism, for example, must be taught together. At present two bogies hanging over the internal teacher were the General Medical Council and the external examiner. The G.M.C. laid down the curriculum, but the students must somehow get a say in choosing that curriculum. They were all registered with the G.M.C.; students in Australia had felt that they were not getting much return for registration, and nowadays no-one in Australia registered.

These stirring words on the curriculum provoked a flood of corroborative reminiscence from his hearers. At one university, it seems, psychology is taught in a course of six lectures, delivered by a teacher who is not a psychologist. One speaker began his address with the uncompromising statement "In —— our greatest curse is bad teachers." He said that of ten lectures a week (compulsorily attended two weeks out of three) it was agreed among the students that four were worth going to, and six were valueless. He pleaded for a voluntary lecture system; teachers who were poorly attended might then improve their technique. A Scottish speaker made a sound point when he said that in general practice minor gynæcological ailments were common; yet on gynæcology his university offered only ten lectures and ten theatres in the whole medical course. Students, however, did clinical surgery for four terms and attended fifty lectures on operative surgery; how often would that stand the general practitioner in good stead? Many appealed for a course which would bear more relation to the needs of general practice: for a chance to see common and trivial ailments and—again and again—for better grounding in preventive medicine. One pointed out that in spite of the lengthening course in chemistry they were taught nothing about industrial poisons. At one medical school the students' union had studied their own criticisms of the curriculum and had finally put recommendations before the staff committee. These had been considered and many of them had been accepted. Some of the set lectures had been replaced by seminar classes attended by not more than fifteen people, and the casualty and gynæcology courses had been improved. All favoured teaching on discussional lines, though there is always a danger that the dullards will hold up progress in a small class. This, however, applies equally to the system of set lectures, as one speaker pointed out; one of his lecturers, he said, read his notes through at dictation speed—and there were students who liked it. In his own view, lectures should be an aperitif, whetting the appetite for reading.

TEACHERS AND TAUGHT

There are evidently students and students, and it is in the nature of meetings of this kind that the best and keenest should attend. Prof. G. I. BOYD at a later session, responding to a speaker who appealed for a wider educational grounding in philosophy and literature, said he often found students impatient of the cultural aspects of even their own studies. In part this is no doubt due to the haphazard manner in which medical students are at present selected; the training is only within reach of those who can afford it, and few of them have a vocation. Professor Boyd found that the 10–15% of dullards could bring down the standard of the whole year, and mentioned with respect the motto of that Spanish university, which runs: "What nature has denied Salamanca cannot supply." He thought students might

well begin with a year of general training in sociology and philosophy, and take courses in nursing, industrial medicine and the relations of doctor and patient late in their course. He suggested, too, that they should have a year of "doing something else" between leaving school and going to the university. One of his realistic hearers agreed that we must improve the material entering medicine, but pointed out that we must also do the best we can with the material we have got. Back came the discussion, hammering away at the curriculum with warmth and good sense. Some were for appointing only trained teachers to teach, deprecating a system which compelled those whose hearts were in research to ladle out elementary knowledge; but some foresaw danger in such a change. Then indeed they might only be taught from potted textbooks, whereas the researcher, however dull his lectures, was established on the growing point of his own subject. As one speaker put it, the good researcher cannot talk badly about his work. It was agreed again that lectures should be fewer and more stimulating, demonstrations direct, and discussion between student and teacher free. Many deplored the gulf separating them from their teachers—even a literal gulf, at one university, where the teachers hurry home across a river, left nameless by the discretion of the speaker. For a few schools the war has helped to bridge the gulf. One of the evacuated London schools is housed in a country manor house, men, women and teachers together; a resident gave a thumbnail sketch of their communal life in which the men chop wood and clean bicycles, the women darn socks, and the teachers behave as men and brothers. One excellent suggestion was made for bridging the gap: that students and teachers should join in group research. This, perhaps, of the many changes suggested is the one which could be put most promptly in commission and which would be most likely to bring a good revolution in its train.

MEDICINE AND THE LAW

Damages against Chiropodist

A CHIROPODIST was ordered to pay £62 15s. damages at Barnstaple county court last month on a claim alleging want of skill in treatment of the plaintiff's foot. Mrs. Colston, the plaintiff, said she had visited him for treatment for corns; but he had taken her foot in both hands and violently twisted and jerked it so that she suffered pain and was unable to walk as well as before. Mr. F. J. Frape, the defendant, said he was a fellow of the Council of Chiropodists and practised as a chiropodist and specialist in fitting shoes. He denied using force or causing pain; if Mrs. Colston had pain when she left his premises, she had pain when she came to him.

The county-court judge was assisted by the report of Mr. N. Capener, orthopædic surgeon of Exeter, upon the X-ray photographs which had been submitted during the trial. He asked Mr. Frape what was the explanation of the change indicated in the condition of the foot. The defendant replied that he could not say; his working upon the foot might have "upset a little stagnation." The judge held that Mrs. Colston had submitted to the treatment voluntarily, with the knowledge that Mr. Frape was a chiropodist and not a surgeon. Mr. Frape, he said, was a professional man of considerable skill who had done good work. He had advised Mrs. Colston that the toes required treatment and she had gone back to him for this purpose. But Mr. Frape had either been wrong in his diagnosis or in the action taken to remedy the trouble diagnosed; "if he did not know, he ought to have advised Mrs. Colston to see a doctor." The judge observed that he did not hold the chiropodist liable for the primary injury but for the advice he gave. Mrs. Colston was entitled to some damages. The judge limited the damages to those for the injury caused by the wrong treatment after the trouble arose; he awarded nothing for any unfortunate treatment which preceded it. And so, we see, a patient has herself to thank if she consults a chiropodist instead of an orthopædic surgeon; on the other hand the chiropodist is in no way prevented by law from practising manipulative surgery, but, if he ventures outside the field of the chiropodist in which he is highly skilled and experienced, he does so at some risk to himself as well as to the patient.

In England Now

A Running Commentary by Peripatetic Correspondents

A PERIPATETIC correspondent recently raised again the old question of crabbed age versus youth. From the internal evidence he was a young man with more than a touch of the arrogance and pitilessness of youth, but he will find in due time that age brings with it enough of disappointments, sorrows and disabilities, without adding to them the feeling that one is despised by one's juniors who are only waiting with impatience to step into one's shoes or to shovel one into the grave. The familiar jibe has again brought out that old men make wars whilst young men fight them, which means presumably that the men who survived the last war made this one and that most fathers do not mind the risk of their sons being killed, and which in any case is an absurdity in a country which chooses its rulers by universal suffrage. We were also of course reminded of Osler's dictum that a man is too old at 60 (or even 40), a rash statement which he regretted afterwards and which he refuted in his own person by living in full activity to the age of 70. Would it have been better for medicine if he had crept into his shell 10 years earlier? The fact, surely, is that the supposed antagonism between age and youth—like the alleged class-war or sex-war—is largely imaginary, for each period of life has its own special qualities: youth, energy and initiative; age, wisdom and experience. Edmund Waller took a kindlier and truer view when he wrote:

> The soul's dark cottage batter'd and decay'd
> Lets in new light through chinks that time hath made.
> Stronger by weakness, wiser men become
> As they draw near to their Eternal home.

The correspondent, I remember, then went on to advocate that most men should retire at 60, but prime ministers were to be allowed to go on to 65—a liberal concession which would have lost the country the present services of Mr. Churchill. There are two main reasons, however, which prevent men from retiring from work: one is that they can't afford to, and the other—and often the more potent—is the fear of boredom and of the general deterioration, physical and mental, which so often follows upon retirement; a mere limpet-like tenacity in clinging to office for its own sake is not common. It is of course right and only just to the juniors that a man should not stay on the staff of a hospital or in a teaching post too long, but a service limit is probably fairer all round than an age-limit. Under any system, however, it is inevitable that some members of the staff will be lost to the hospital while still at the height of their powers and others will stay on for years who had better have disappeared earlier.

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For their increase in longevity the old are not to blame (unless they are all expected to commit suicide about the age of 70); it is largely the work of our profession and we must face its physical, just as governments will have to face its economic, consequences. Since the beginning of this century preventive medicine has been mainly occupied with the welfare of children and it is time that the old had their turn. We must supplement pædiatrics with geriatrics, a science of the diseases of age, and child psychology with senile psychology. It is astonishing how little most of us know of the peculiarities exhibited by disease in old people and of the best way of alleviating their many minor disabilities, and those who have the opportunity of acquiring such knowledge in institutions and hospitals for the chronically sick do not seem to pass their experience on to the profession at large.

Many old folk in all classes of life have, as every doctor knows, great difficulty in even keeping together a home in which they can die comfortably. In the days of large families there was usually an unmarried daughter who looked after the aged parents and this, though often hard on the daughter, at least enabled them to keep a home. But now the daughters are either married or have jobs of their own while the parents are too unselfish to keep them tied, and hence the number of unhappy and often querulous old people to be found in boarding-houses and private hotels, for many of them cannot afford the

doubtful luxury of a paid companion. There is a real need for superior almshouses, especially for superannuated gentlefolk, where, for a reasonable payment, they could have at least a bed-sitting room with the use of a communal dining-room, recreation-room and garden, with a resident nurse to attend to their minor ailments. In such places they could husband out life's taper without the haunting fear of what is to happen to them if they should fall ill. If I were a rich man it should be the first of my war-aims to build such refuges; it would be as "practical and limited" as the peripatetist's war-aim of a fixed retiring age, and is a necessary corollary to it.

* * *

It has always been my lot to be associated in some way or other with zoological gardens, no matter where I have been domiciled, and people often ask me if I approve of keeping wild animals in captivity for public exhibition. At one time I was content with the answer that if scientific knowledge is gained in this way the business is quite legitimate, but I have learned slowly that in the average zoo little scientific observation is carried out on the habits or life-histories of the inmates; and that such as is done is so uncontrolled and uncoördinated as to render it almost useless. I have sadly realised that little is added to real knowledge by the keeping in captivity of beautiful wild creatures and that many zoos are doing little better than providing wild beast shows for the entertainment of a public that should demand a more æsthetic introduction to nature. In addition there comes the question of cruelty involved, even in a wild beast show. I have grown accustomed to a philosophy that for the powerful hunting animal captivity is undoubtedly irksome, unless the animal is bred of a long series of captive ancestors that has never known the wild. I have a fancy that this thesis is defensible, despite the restless hunting urge that manifests itself even in the menagerie-bred carnivores. But I have always thought I was on safe grounds in urging that for the many frightened little animals, whose lives were ruled by dread and apprehension in the wild, the assurance of complete and assured safety compensated for the loss of liberty when in captivity. This also I believe to be a thesis capable of common demonstration. The assurance of food, of safety, of shelter and of permanent residence under conditions as nearly ideal as human ingenuity can devise is a great compensation to a little, timid, hunted animal whose wild life is spent in fear and apprehension.

In teaching students anything concerning the zoological position and the racial differentiation of man it has always been my aim to insist that civilised man is, and has long been, a domesticated animal. Moreover, a large section of mankind is not only domesticated, for the worker must also be regarded as an animal living in captivity. Now to consider man as a domesticated animal is a helpful scientific concept, as anyone who has considered human racial differentiation in the light of Darwin's "Variation of Animals and Plants under Domestication" of 1868 must agree. But to consider man as a captive animal is a more complex problem, since it entails some knowledge of the social system under which he is held captive. If we accept the basal thesis that man, as a member of the primates, is a frightened animal in the wild, we must face the question: "Has captivity diminished his fears?" There is plenty of evidence on which such a question can be debated. Natural, wild living, free man has his fears. In certain places he fears wild beasts, he fears the failure of his hunting, he fears droughts and calamities of nature. He fears the hostility of neighbouring tribes. But his fears are transitory. They remain to be faced but their conquest is likely to create a return to the normal routine of life. What of captive man? His fear, once he has taken upon himself the responsibility of the normal state of manhood, is fixed indelibly on him. His life is ruled by fear. Fear of failure in his work. Fear of illness. Fear of incapacitation. Fear lest those dependent on him are deprived of even the necessities of life while he is unable to earn a wage. Under the system prevailing in our so-called civilised and Christian countries, fear is the dominant note in the lives of all those men captive owing to our present social regime. It should not be beyond the imagination of the ordinary man to picture a state of affairs in which this ever-present and terrible load of fear is lifted, in which the illness or incapacitation of the wage earner did not spell ruin to the family, in which man, necessarily a captive in a world economic system, yet had the protection, the security and the assurance afforded to a timorous rodent in a zoological gardens. It seems no very idealistic plea that man, captive though he may be as a domesticated animal, should yet have meted out to him the assurance that anxiety, fear, dread of enemies and of shortage of food should be eliminated from his life as it is, for instance, in the life of a captive hamster. There is surely an economic social regime that could accomplish this.

* * *

Almost every practice has at least one Great Professional Sufferer, whose agonies and tribulations surpass any previously recorded ("Nobody can realise a thousandth part of what I endure"), but whose heroic fortitude, in spite of being misunderstood, in spite of lack of sympathy, snatches them time and again volubly from the grave ("My doctor says it is only my wonderful spirit that keeps me alive"). Such a one was the writer of France Pastorelli's "The Glorious Bondage of Illness" (Allen and Unwin. 2*s*. 6*d*.). She was a musician, who is said to have developed an incurable form of heart disease, and to have been in bed for four years. If the book goes to another edition—and I hope after all the lady will live to a ripe old age—a few clinical notes and an electrocardiogram would add interest for the medical reader. I confess after reading the book I have not diagnosed the cardiac complaint.

There are two classes of great professional sufferer. There is the humbug class who are G.P.S.s because it pays them to be; it is the only way they can dominate their families or be important, or it is the most comfortable way of living. I remember seeing about twenty of this last sort all together; it was not in this country, they were all soldiers, alleged to have contracted tuberculosis in the Great War. Each had a chalet, was well fed and looked after, and enjoyed heroic status, though few had heard a shot fired. They had been there for ten years when I saw them, and probably are there still. Any suggestion that tuberculosis was a curable disease and of getting a move on was regarded as an insult, a brutal attempt to stop a comfortable career. The other class is far more interesting; they are among those patients whom Nature wants to lie still, and so she has given them a marvellous power of dramatising themselves and their surroundings. A year ago I had a patient who lay like a log for three days with influenza. I asked him what he had been thinking about. He had imagined he was covered with invisible paint, and after various adventures in this country, including an invisible interview with the P.M., he had gone into Germany and done some gloriously horrible things. It was like a thrilling film and he was acting the principal part. "Did you kill Hitler?" I asked. "No, I slipped into his bedroom and came over and stood by the side of his bed with my knife, all covered with invisible paint, of course, ready in my hand, I saw the vessels in his neck beating, then he turned and looked at me, and with his moustache lying down and without his false teeth he looked so pathetic. . . ." Anyway that fantasy kept this young man quiet and amused for three days. Some of Henley's manly verse and Stevenson's adventures are of this origin, healthy songs and stories that Nature made them tell themselves, which only incidentally came afterwards to us. The first object of Keats's poetry was to keep him and his flaming lung quiet. What a potent force this is, which could make him see his crystal dreams sublime in an apothecary's shop, or can for a little while at any rate transport every ailing exile home.

The second class of G.P.S.s consist, I think, of patients in whom this process is at work, but who haven't the imagination, the visual imagery, to build a complete fantasy, and thus spoil it by mingling it with truth, the sordid truth of illness and the sick room. Madame Pastorelli probably belongs here and within these severe limitations she has written a book with some artistry. A healthy person's reaction to reading it will be impatience with the author and her "many Gethsemanes"; on no account should these chapters be put into the hands of a sick person, for, as the American girl said of the Ten Commandments, they just put nasty ideas in one's head.

Of all the administrative difficulties that beset the unwary in a hospital such as ours the difficulty of getting and keeping maids is perhaps the most trying, and certainly the most persistent. Mere difficulty of securing an adequate nursing staff pales into insignificance beside this other major evil, an evil not, of course, peculiar to hospitals in these days but possessing for them such nightmarish urgency as threatens to bow down matron and her satellites, who are not easily bowed down. We have looked for maids in all sorts of likely and unlikely places—labour exchanges, servants' registries, Women's Voluntary Services—and have enlisted the help of headmasters of schools and many others, often to no purpose. Our failure cannot be ascribed to any lack of assiduity or perseverance, for we "would fish all day though not encouraged by a single nibble." Yet sometimes we do have our nibbles, and the catch is an extraordinary assortment of the too well educated, the not too well educated, the impudent, the fat, the angular and the unsophisticated (for a little); we have met them all. Some of them have merely inquired about us, some have come and looked at us and gone away, a few have come and looked like staying. Hospital life seems to appeal to a few of the more gregarious, but even that appeal sometimes becomes dimmed by the kind of work to which they are assigned. There is comparative willingness to do ward maids' duties, but a dearth of applicants for work in the kitchen. The process of educating such a varied assortment is naturally painful; doubtless painful for the maids, and often painful enough for their victims. The supervision of maids is no easy task, calling for qualities of acidity and pugnacity, commonly only encountered in elderly spinsters. The routine seems to be an unending round of roll-calls and remonstrances, homilies on polishes and breakages thinly interspersed with lessons in deportment.

If it is difficult to obtain maids it is still more difficult to keep them. Scarcely a month passes without some secession, and occasionally we encounter a phase of mass evacuation when whole battalions (or so it seems) threaten to down tools in a body and away like some burst of eruptive activity that threatens to throttle our whole domestic being. The end of the month is a period of tribulation and of dread, of stock-taking and of retribution. We then speculate on how many will leave us on the morning after next pay day. The factors producing these major disturbances are sometimes wholly beyond our control, for a very minor incident in kitchen warfare can precipitate a crisis far-reaching in its effect and may lead to the defection of considerable cohorts. Our geographical situation, remote from large centres of population, does little to commend us to our maids, and we are driven in self-defence to provide for their entertainment as liberally as we can in the hope that we may compensate in our amateurish way for the missing flesh-pots. Certain it is that our maids are amongst the most regular attenders at our entertainments, as they are the most outspoken critics of our entertainers.

* * *

I wonder whether the Dunmow flitch is to be offered this year. Since 1244 it could be claimed by any pair who were prepared to swear at the end of their first year of married life that they had had no quarrel and had never wished the knot untied. The kudos of winning used to be more important than the prize itself, and few thought it worth while to indulge in an orgy of marital bliss for a mere chunk of bacon. But now the boot is on the other foot; what is fame compared with enough pig to last a small family for months? The flitch would be free, of course, but would it be couponless? If so the judges had better prepare for a rush of entries like an Irish sweepstake and we must look for a pandemic of nauseating sweetness in the home, at least when there are witnesses present.

PHENOTHIAZINE has established itself in veterinary medicine as an anthelmintic with a low toxicity, and in our own columns (*Lancet*, 1940, 2, 808) Dr. P. H. Manson-Bahr has described its application in human medicine to the treatment of threadworms. I.C.I. (Dyestuffs) Ltd. inform us that they have made the drug readily accessible for this purpose in 1 gramme tablets. A sweetened granule form containing 25% phenothiazine will also shortly be available for children.

Letters to the Editor

AIR-RAID STRAIN IN MENTAL-HOSPITAL ADMISSIONS

SIR,—When assessing ætiological factors in cases admitted to this mental hospital, we have had to consider the possibility of air-raid strain as playing some part, since this is not infrequently suggested by relatives on the routine inquiry form. I am therefore investigating all cases admitted since Oct. 1, 1940, from this point of view, and hope to furnish a detailed report at some future date. Meanwhile, the gist of an analysis of the first 200 cases may be of interest. Air-raid strain as an ætiological factor was suggested in 25 (12½%) of the cases, but in only 2 (1%) was this regarded as of major importance and in 3 (1·5%) as partly contributory. The former 2 cases have both recovered, and one of the latter group has departed much improved. It is not therefore expected that there will be any burden on mental-hospital accommodation as a result of air-raid strain.

I would also like to record that although our hospital has a fair share of the noises on the South Coast, and on one occasion received a direct hit, the demeanour and behaviour of the 1200 patients has in no way been affected. Occasionally there is a complaint about disturbed sleep at night, and a few patients still maintain that they will not get out of bed for Hitler or anybody else!

Knowle Mental Hospital, Fareham. I. ATKIN.

A PSYCHIATRIC CASUALTY

SIR,—I have recently come across a type of case which must be very common in certain areas in these days of intensive and prolonged emotional stress and which should receive prompt recognition and treatment.

A man of 38, single, was working as a fitter in a well-known south-coast port during August of last year. His employers were working on Admiralty contract and he was engaged on this work. During the course of his duties he suffered an injury to his back which incapacitated him for a fortnight, though no actual injury was ever demonstrated. After this he returned to work and remained there with frequent interruptions due to hysterical "collapses" until Dec. 26, when "conditions became intolerable" and he returned to his home in the north. During this period (August to December) he was subjected to blitz conditions, and, to cut a long story short, there is little doubt that his final collapse and his present state are due to fear of bombing. He naturally attributes his emotional state to his accident and is at much pains to convince all and sundry of his immunity from the consequences and effects of war in the air. By reason of the nature of his work, he is apparently bound to return to the scene of his fears if he recovers, and so he is becoming a confirmed hysteric and he therefore requires intensive psychotherapy and rehabilitation.

In my opinion this man is a psychological casualty of war and should be treated as such at a neuropsychiatric unit, but he is not eligible for treatment under the Emergency Medical Service—this would doubtless create a precedent! There must be many similar cases needing such specialised intensive treatment, who for lack of suitable provision are becoming economic dead weights to the community at a time when the community can ill afford such luxuries.

Ryhope, Sunderland. T. M. CUTHBERT.

INJURIES TO TENDONS

SIR,—Your review (p. 382) of "Surgery of Modern Warfare" (Part III), in discussing the suture of the flexor tendons of fingers and hand, states that if the sheath is involved the prognosis is hopeless. In a recent discussion in the *British Medical Journal* the consensus of opinion was similar. In a large glass works the medical officer is faced with divided tendons much more frequently than in other industries, and after various trials I have come to the conclusion that although the problem of the digital portion of the flexor tendon is a difficult one it is by no means insoluble. Since in recent years I have had some measure of success, ranging from partial to full restoration of function, a summary of the technique employed may be of interest.

1. Incision lateral, avoiding injury to vessels and nerves.
2. Full exposure of both proximal and distal cut ends.
3. The use of braided silk no. 5 or 7 attached to a straight or curved needle of the "intestinal" type. The suturing is done very carefully so that there is no increase of diameter at the site of suture, and the tied ends are buried between the cut ends of the tendon.
4. At one time I tried to restore both the tendons and the sheath, but it was obvious that the profundus and sublimis tendons fit so tightly within the sheath that a trivial adhesion is sufficient to prevent function. In recent years I have therefore departed from this in two particulars:

(*a*) The sublimis tendon is removed for some distance proximal to the site of injury, retaining however the split portion which gives passage to the profundus.

(*b*) The sheath itself, all except the floor, is excised both above and below the site of injury, with of course the proviso that the "pulleys" are not interfered with.

Active movements are started immediately and, if possible, maintained. Sometimes however tissue reaction gives the impression that the above procedure is a failure, but I find that if the patient returns to work for some weeks there is a gradual increase in elasticity and coincident with this an increase in function. If after this waiting period there is little or no movement, then the finger is opened up again and adhesions severed, and if scar tissue is too evident this is dissected out and the tendon itself covered with a paratenon graft from over the triceps at the elbow.

St. Helens, Lancs. R. M. JONES.

THE NEUROLOGICAL APPROACH TO MENTAL DISORDER

SIR,—It was a pity that Group Captain Symonds, in his presidential address to the psychiatric section of the Royal Society of Medicine, did not keep rigidly to his chosen title. Difficult as was the task which he had thus set himself, he might nevertheless be sincerely congratulated on the skill with which he had marshalled facts, experiments and theories in neurology which could have any conceivable bearing on the problem. But, unfortunately for the complete success of his address, this did not content him and he passed beyond his own specialty to a consideration and criticism of another science—viz., psychology—in which his knowledge and insight were not up to the same standard. Indeed he seems quite unaware of what modern psychology is, or of the extent of its contributions to modern medicine, of a strictly scientific and verifiable nature. The whole field of mental testing, the numerous psychological investigations into the building up of conditioned reflexes of every kind in the mental sphere, including the new insight reached thereby into the nature of suggestion and suggestibility and of the formation (as contrasted with the radical causation and meaning) of many neurotic symptoms, and—at the other end of the scale—the facts and theories of character types and the more philosophical problems of knowledge and will, are all of the utmost importance for modern neurological and psychiatrical theory but receive no consideration from him. On the other hand he makes dogmatic statements about psychotherapy—i.e., psychology as applied to the problems of medical treatment—which will be unhesitatingly rejected by every trained psychologist who has a medical qualification. Psychology is becoming an ever more important and indispensable subject in the medical curriculum, with lessons for the general practitioner and for the specialist in every field, but in difficult cases there will always be a demand for highly specialised psychological treatment and highly trained psychotherapists.

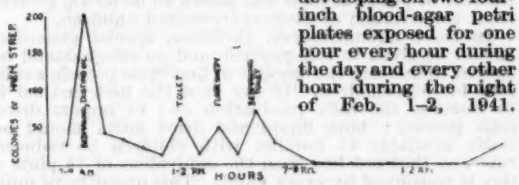
Oxford. WILLIAM BROWN.

SIR,—To an outsider it seems a pity, especially at the present time, that so much valuable space should be allotted to the disagreements of neurologists and psychoanalysts. Further, it seems illogical that psychoanalysts, whose branch of psychology derives more than any other from neurology and neuropathology, should have chosen the rôle which they are playing. Surely all but ultra-vitalists regard the nervous system as the physical basis of psychology, however inexplicable with our present knowledge the relationship may be. Yet no neurologists can be so foolish as to underestimate the value of the contributions of pure psychologists, most of whom have had little or no training in neurology. Just as astronomy made vast strides before Newton discovered the law of gravitation, so every branch of psychology elicited verifiable facts of theoretical and utilitarian value in spite of ignorance of neurology. At no time has psychology been so important to humanity as now, and it behoves each branch to contribute its quotum of positive value, and so far as possible to coördinate the results. Cannot the more moderate neurologists and psycho-analysts get together and segregate their points of agreement, leaving the more intransigent to plough their lonely furrows and prove their worth by the crops which they produce?

Leeds. J. HERBERT PARSONS.

INFECTED DUST

SIR,—The accompanying chart shows more graphically than words or figures can the effect of disturbing the dust in a single-bedded cell housing a boy convalescent from scarlet fever. The chart was prepared from counts of the total number of colonies of hæmolytic streptococci developing on two four-inch blood-agar petri plates exposed for one hour every hour during the day and every other hour during the night of Feb. 1–2, 1941.



This boy was infected with a type-2 streptococcus on admission but a week later nose and throat swabs gave cultures of a type-3 streptococcus. It was found on inquiry that in a cell on the opposite side of the corridor which separates two rows of cells was a patient—the only one—with a type-3 streptococcal throat infection. The dust of her cubicle also contained the type-3 streptococcus, and further investigation indicated that this streptococcus gained access to the boy's respiratory tract by transfer and inhalation of the infected dust from the opposite cell. Henceforth the boy's nose and throat cultures yielded streptococci of both types 2 and 3, while type 2 was usually more scantily represented than type 3 among colonies picked from "exposed" plates or cultured dust.

ROBERT CRUICKSHANK.

L.C.C. Group Laboratory, N.W.3.

FEEDING OF THE YOUNG

SIR,—I was most interested to see Professor Mottram's letter, written at a time when the problem of providing adequate first-class protein in the child's diet assumes even greater importance, and I should like to take this opportunity of voicing again my own fears and alarms. Professor Mottram has given a figure of 30 g. of first-class protein a day for the child of 9–10 years, and has shown that under present conditions the child of the middle class will barely achieve this amount, so that, he says, the poor child is bound to suffer from a deficiency; it is only fair to say that this should not necessarily follow in circumstances where foods are rationed, since all children should be receiving their ration, but we know only too well, as Sir John Orr has said, that the protective foods are increasingly rationed by price, and it is clear that they will continue to be so until family allowances help to prevent such an anomaly. Who could doubt this who has read the many recent careful studies of working-class diets—for example, that of Najib U. Khan in Newcastle-upon-Tyne, in which it is recorded that in unemployed families the average consumption of fresh milk was less than ½ pint per man per week, or that of Dr. T. N. V. Potts on 205 families in the West Riding of Yorkshire, in which he showed the average consumption of fresh milk in all the families was not more than 2 pints per head per week, and in which he says "the average consumption of milk per head decreases as the number of young children in the family rises, so that the diets of the poorer groups of families are likely to be specially deficient in the so-called protective foods and more especially in those families which contain several young children."

In my view the figure of 30 g. daily of first-class protein for a child of 8–10 years is on the low side; even the B.M.A. diet of 1933 gave a figure of 35·1 g., and the League of Nations 1936 report gives 44 g. for a child of 6 years and 56 g. for one of 12–14 years, say, 50 g. for a child of 8–10 years. My figures (*Publ. Hlth*, April, 1939) showed that when rate of growth in children was correlated against the ratio of expenditure on first-class protein and energy foods (P/E) an improvement in the rate of growth occurred up to a ratio of 1·5, this being the highest ratio recorded, so that for a child of 8–10 years the weekly expenditure of 50 pence of the B.M.A. 1933 diet should have been expended in the ratio 32·1/17·9 and not 23·5/26·5 as the diet suggested. This would mean that even the B.M.A. 1933 diet should have permitted 50 g. a day and not 35·1 g. as given. But this is not the whole story, for further figures (*Publ. Hlth*, July, 1939) have suggested that the B.M.A. diet is itself not more than 64% of that which would provide the best rate of growth in children, and if this is the case even 50 g. must not necessarily be looked on as the amount which nature would provide by choice. It is not surprising, therefore, that the average rate of growth of a number of public schools was shown to be 53·8% greater than the average of elementary-school children.

In these circumstances, therefore, special attention should be given to this problem and no effort should be spared to increase the amount of first-class protein available for our children. In my view the best method is to increase the milk production and to import dried milk powder; both liquid and dried milks should be made available to families with children at reduced rates, so that not less than the equivalent of 1½ pints a day is consumed by every child. This quantity of milk provides roughly 27 g. of first-class protein, which may be taken as somewhere near half the amount necessary. At the same time, of course, it will provide other valuable growth-promoting substances, such as the essential mineral elements, calcium and phosphorus, which cannot be obtained so readily in any other way. Another measure which might reasonably be taken would be to lower the age of the meat ration to perhaps 2 years so that the larger adult portion of meat is made available to all children. In doing this we must not imagine for a moment that making the meat available is the same as providing it, since the larger families have not the means to purchase it even when it can be bought. Can any time in our history be more propitious than this for introducing family allowances?

Warwick. FRASER BROCKINGTON.

SCOTLAND

PARATYPHOID IN THE HIGHLANDS

THE outbreak of paratyphoid B in the shires of Ross and Inverness has raised some interesting administrative problems although clinically the disease was familiar enough. Frontal (or occipital) headache plus slight epistaxis left little doubt about diagnosis once the epidemic was recognised, and there was at least one case of intestinal hæmorrhage serious enough to require transfusion. Nevertheless the mimicry of other diseases has led in places to some delay in notification. The first case was diagnosed about six weeks ago near Tain in Ross-shire and the main incidence was in the eastern part of that county, particularly around Alness, where over 50 cases occurred in one practice. Up to the time of writing some 40 cases have been reported at Inverness and a dozen at Nairn; isolated cases have turned up in remote spots. The fever hospital at Strathpeffer has admitted more than 80 of the patients, the segregation regarded as essential by the health authority not always proving acceptable to the local gentry. Sulphonamides have been used pretty freely in daily doses of 6 g. or so without apparent effect on the course of the fever. The distribution of the outbreak soon acquitted either water or milk as the vector, but the pastrycook is still under suspicion. A salutary by-effect of the outbreak has been a recognition of the need for protecting institution staffs against falling victims to infection. The less heroic members of the staff are, however, apt to compare the painful local reactions after inoculation with the apparently lesser discomfort of a mild attack of the disease.

Parliament

IN the House of Lords on April 2 Lord HANKEY said that the three great pillars of the permanent civil research organisation of the Government were the Department of Scientific and Industrial Research, the Medical Research Council and the Agricultural Research Council. Important research organisations also exist in the Admiralty, the Ministry of Supply, which undertakes most of the research work for the War Office, the Air Ministry and the Ministry of Home Security, while the Scientific Advisory Committee, of which Lord Hankey is chairman, links up through the Royal Society the great stream of outside research with these Government activities.

Speaking of the work of the Medical Research Council Lord HANKEY said that in concert with the Ministry of Health preparations were made even before the war to safeguard public health against the risks of war conditions. An Emergency Public Health Laboratory Service was established with laboratories all over the country so that any unusual outbreaks of disease might be rapidly identified. Stocks of anti-sera and vaccines were accumulated and distributed throughout the country. The application of research in nutrition usually lagged some fifteen years behind discovery. But under pressure of war conditions the results of research are now being applied in many directions. A stream of guidance is being issued to the public bringing out the importance of milk, potatoes and vegetables, which provide the essential vitamins and mineral salts in their natural and most effective form, and right methods of cooking. A national wheatmeal bread, the result of concentrated emergency research, has been put on the market. Lord HANKEY emphasised that the sphere of the Medical Research Council extends far beyond medicine as that term was generally understood. It is concerned in all problems that affected man's health and efficiency. We are engaged in a death struggle, but Lord HANKEY held that our scientists are at least as good as those of Germany, and we are building a scientific equipment which is destined to play an ever-increasing part in our war effort and in the period of reconstruction which must follow.

Sunday Opening

On All Fools Day the House of Commons discussed an order in council giving discretionary powers to local authorities to open on Sundays theatres and music-halls where troops and changed industrial conditions created a special demand. To a lively debate which, as Mr. A. P. HERBERT said, showed sincerity and eloquence if not always Christianity, Sir FRANCIS FREMANTLE brought a whiff of scientific detachment when he claimed that the jazzification of the Sunday was a further inroad on the mental health of the nation. The preservation of his Sunday rest was now especially important to the worker. Mr. HERBERT MORRISON who summed up said Parliament had had a day out of the ordinary rut and they were probably all the better for having had a free and independent discussion. He pointed out that the regulation would end with the war and that it preserved local option. He believed it would help to keep people cheerful and happy. But on a free vote the order was annulled by 144 to 136.

The Budget

The main aim of Sir KINGSLEY WOOD in the fourth war budget, which he introduced on April 7, has been to ward off inflation. He puts our expenditure for the coming year at £4207 million (excluding the value of goods obtained from the United States under the Lease and Lend Act and payments to be made there for current orders), compared with the estimate of £3884 million for last year. This total includes certain expenditure "covered by the gross balances of the Dominions and other countries," and the figure for domestic expenditure may be put at £3700 million. Of this about £1600 million is expected to come from existing taxation, and the same sum from savings, leaving a gap of £500 million to be filled if inflation is to be avoided. Half of this the Chancellor hopes to meet by increased savings, and the remaining £250 million is to be raised entirely from direct taxation. The standard rate of income-tax will be 10s.

instead of 8*s.* 6*d.*, with 6*s.* 6*d.* instead of 5*s.* on the first £165 of taxable income. Income-tax will be payable on all incomes over £110, instead of £120 as at present, and this will bring another two million people into the taxable class. The allowance for earned income is reduced from a sixth (maximum £250) to a tenth (maximum £150), and the personal allowance from £170 to £140 for married people and from £100 to £80 for others. The extra tax paid because of the reduction in earned-income and personal allowances will be credited to the taxpayer in the Post Office Savings Bank at the end of the war, so that Mr. Keynes's plan for compulsory savings has made its mark. The same idea is seen in the concession by which 20% (less tax) of the excess profits duty paid will be set aside as a reserve for postwar reconstruction. No change is made in allowances for children. Where tax is deducted from salaries the new scale will take effect from Nov. 1; for others it will apply to the instalment due on Jan. 1, 1942. The Chancellor promised that the Government would extend the principle of stabilising the prices of essentials—including fuel and lighting—with additional subsidies where necessary. The medicine stamp duties are to be repealed from Sept. 2, and the Minister of Health will be introducing legislation "to maintain a fair balance between the interests of the pharmacists and of other vendors."

QUESTION TIME

Salaries for Nurses

In answer to a question the Minister of Health made the following statement: The existing and prospective shortage of nurses in hospitals is giving rise to anxiety. Thanks to the reinforcements provided by the Civil Nursing Reserve the emergency hospitals dealing with civil and military casualties are for the most part adequately staffed. Our main concern is with the hospitals which provide for the general needs of the civil population and in particular those dealing with infectious disease and the old and infirm. Here the shortage is in some cases acute. Available beds cannot be used on account of shortage of nurses, and staffs are carrying on under increasing difficulties. To meet this situation, I propose to appeal to the women and girls of the country to enrol for nursing service in any part of the country. Those who join as nursing auxiliaries will not be sent to hospitals dealing with infectious disease or mental cases or to sanatoria, unless they volunteer for this service. The appeal will be especially addressed to the age-groups which are shortly to be registered.

I wish to stress the importance of securing a larger number of women who are prepared to take up nursing as a life career. Those who are prepared to join on this basis and accept training in the hospital allotted to them will receive salaries at the rate of £40 a year rising by annual increments of £5. It is proposed also to increase the salaries of members of the Civil Nursing Reserve in residential posts in hospitals. The salaries for the assistant nurse and trained nurse include a sum representing the employer's contribution towards superannuation and the rates[1] will be:

For nursing auxiliaries	£55 a year
For assistant nurses	£70 a year
For trained nurses	£105 a year

in each case with board, lodging and laundry and indoor and outdoor uniforms. Those who respond to the appeal and are accepted will receive a guarantee of a year's employment and will be asked to undertake to serve for that period. Recruits who join as nursing auxiliaries will receive a short course of instruction in hospitals during which they will receive 10*s.* a week as pocket-money, together with board, lodging and laundry.

The inter-departmental committee under the chairmanship of the Earl of Athlone made a number of important recommendations, consideration of which was deferred by the war. Of these perhaps the most important related to the machinery for fixing the salaries and pensions of nurses on a national basis, and recommended the establishment of salaries committees for this purpose analogous to the Burnham committees in the teaching profession. I propose to take immediate steps to consult the various interests concerned with a view to establishing the necessary procedure. This, however, will take time, and in the meantime it is in my view very desirable that hospital authorities should review the salaries now paid to their nursing staffs in the light of the new rates.

I have already on the staff of the Ministry at headquarters and in our regional offices 53 state-registered nurses, partly recruited for the E.M.S. services and partly engaged on the public-health and hospital work of the department. Arrangements have now been made for the whole of this work to be grouped on its professional side under the general direction of a chief nursing officer with two deputies. I have appointed as chief nursing officer and chief matron of the Emergency Hospital Service Miss Katherine Watt, principal matron of the Emergency Medical Service. One of the posts of deputy will, in my view, be most appropriately filled by the appointment of a nurse with current experience of hospital management, and I hope to make such an appointment at a very early date. I also propose that the second deputy should be a nurse with special experience of public-health and domiciliary nursing services. I have asked the Parliamentary Secretary to make the nursing division her special concern. The Secretary of State for Scotland is making similar arrangements.

Mr. RHYS DAVIES: Will the Minister bear in mind that a number of girls and women are willing to serve in hospitals if they are not thrust into nurses' homes? Can they not engage in this service and go to the hospitals to do their day's work, going home in the evenings when their homes are near the hospital?—Dr. SUMMERSKILL: Does the Minister realise that the new scales are not as high for a qualified nurse as a girl can receive in domestic service to-day?—Mr. BROWN: I have reason to believe that these scales will be regarded, taken as a whole and in the light of what I have stated, as a very great forward movement, and they will mean very heavy extra expense for all hospitals concerned as well as for the Government emergency scheme.—Mr. D. FRANKEL: Does the Minister realise the repercussions which this will have financially on the local authorities, and does he propose to make any subsidies to them?—Mr. BROWN: I will take into consideration any representations that are made when the facts are brought out. I am told that for the London County Council the suggested increase for nurses in all grades would involve an additional expenditure of £70,000 a year.—Mrs. AGNES HARDIE: Will the Minister consider training some men as nurses under the same wages and conditions?—Dr. SUMMERSKILL: At £55 a year?—Mr. BROWN: There are, of course, male nurses, and they do very valuable work for the patients in regard to whom their services are appropriate.—Mr. J. MCGOVERN: Are these wages intended to drive girls into munition work?—Mr. BROWN: I have reason to believe that they will help to solve what has been one of the most difficult of our problems.—Mrs. H. B. TATE: The Minister obviously comes within the definition of an optimist.

Sir STANLEY REED: Since many nurses marry and do not qualify for superannuation allowances, will the Minister consider a provident fund which would benefit both those who do their full term and those who retire before its completion?—Mr. BROWN: That will be one of the long-term questions to be discussed.

Superannuation of Service Nurses

Viscountess ASTOR asked the Secretary of State for War whether his attention had been called to the fact that voluntary-hospital nurses who were called up for duty in His Majesty's nursing services had either to lose a substantial part of their pension benefits by reducing their contributions to the superannuation scheme or to cease the contributions and convert their policy into a paid-up assurance, or to pay contributions usually paid by their hospital as well as their own contributions; and whether, in view of the hardships imposed at present on nurses, he would arrange for the payment by the War Office of the employers' contributions.—Captain H. D. R. MARGESSON replied: I have given careful consideration to the position under the Federated Superannuation Scheme of nurses from voluntary hospitals called up as members of the Queen Alexandra's Imperial Military Nursing Service Reserve or the Territorial Army Nursing Service, but I am afraid that it would not be practicable for the War Office to pay the employer's contribution towards superannuation benefits, which had previously been paid by the hospital. I am, however, reviewing the conditions of service in the nursing service, and I hope to be in a position to announce very shortly certain increases in pay which will help to meet the difficulty.—Miss I. WARD: In view of the fact that these negotiations have been going on for over 18

1. Current rates of pay for nurses in the Civil Nursing Reserve employed in hospital are: nursing auxiliaries, £2 3*s.* 6*d.* a week (less board, lodging and laundry); assistant nurses, £64 2*s.* a year (plus board, lodging and laundry); trained nurses, £99 2*s.* a year (plus board lodging, and laundry).

months can the Minister say when he will be able to give decisions on the review?—Captain MARGESSON: I think the matter is coming to a head now.

Removal from the Nursing Register

Mr. R. W. SORENSEN asked the Minister of Health whether he is aware that many hospital authorities refuse to employ fully qualified nurses, or to train probationers, who have been, or are, unmarried mothers; and, in view of the recent action of the General Nursing Council in removing the name of a nurse who was an unmarried mother from their register, whether he will take action to prevent unjust actions of this character?—Mr. BROWN: The answer to the first part of the question is No. With regard to the second part of the question, an appeal lies to the High Court against a decision of the General Nursing Council to remove the name of a nurse from the register, and the matter is not one in which I have power to take any action.—Mr. SORENSEN: In many of these cases is it not morally reprehensible to exclude these women on these grounds, and will he do what he can to discourage it?—Mr. BROWN: That is a matter of opinion and conviction.

Dr. EDITH SUMMERSKILL: Does the Minister approve of the removal of a nurse from the register because she has had an illegitimate child in a case where it has not been proved that she has been guilty of professional misconduct with a patient?—Mr. BROWN: You are asking me to express an opinion upon what the court may or may not say about particular cases, and I must refuse to do that in the absence of any evidence about the cases.—Dr. SUMMERSKILL: I am asking the Minister to express an opinion because the Ministry is represented on the General Nursing Council.

Rehabilitation of Injured Workers

Mr. T. MAGNAY asked the Minister whether he is now able to make a statement on the steps proposed for securing that modern and properly organised treatment is provided for fracture cases occurring amongst industrial workers?—Mr. BROWN: The Secretary of State for Scotland and I have consulted the Minister of Labour and other Ministers concerned, and propose to provide for these cases as far as possible under the Emergency Hospital Scheme. The hospital accommodation available under this scheme includes a large number of beds in hospitals and orthopædic centres which are, or will shortly be, specially equipped for dealing with cases of fracture. In these hospitals and centres there are available, in addition to surgical skill of the highest class, the most modern forms of treatment by physiotherapy—including massage, electricity, and remedial exercises—and occupational therapy. For the purpose of treating war casualties, both military and civil, these facilities are welded together into a comprehensive organisation, supervised by the consultants in orthopædic surgery employed by the Ministry of Health and the Department of Health for Scotland, so that the patients can be sent to the hospitals best suited for dealing with their injuries and, if necessary, transferred from one to another in the course of their treatment. The treatment of casualties is and must remain the primary purpose of the Emergency Hospital Scheme. But, in order to secure the fullest possible use of the organisation which has been provided, the Government have decided that in so far as there are vacant beds not likely to be required for the treatment of war casualties, they should be made available for fracture cases occurring amongst certain classes of the civil population whose early return to work is of special importance to the national cause. Accordingly, cases of fracture sustained, whether in the course of their work or not, by manual workers engaged in any of the following employments, munition work—including shipbuilding and ship-repairing—building and civil engineering, mining, agriculture, fishing, public-utility undertakings, shipping and transport, will be eligible for treatment in hospitals or centres under the emergency scheme. Whole-time paid civil defence personnel will also be included in these arrangements. As in the case of certain classes of the civil population who are under existing arrangements admitted to hospitals in the scheme for general treatment, the patient admitted under the new scheme will be expected to contribute through any contributory association to which he may belong, or, if he is not a member of such an association, to pay such amount as he can reasonably afford towards the cost of his treatment, according to ordinary hospital practice. I may also add that the ordinary practice in Scottish hospitals will continue.

Major MILNER: Will the same opportunities not be available for part-time civil defence workers?—Mr. BROWN: No.—Sir FRANCIS FREMANTLE: Will these excellent arrangements be extended not only to fracture cases but to many other cases which require the same treatment and rehabilitation, and are equally important, and will the Minister avoid a duplicate organisation?—Mr. BROWN: There has been no duplicate organisation. The number of first-class hospitals with first-class equipment and surgeons with special qualifications is limited. What we have to do is to use those resources to the maximum extent in order to get those injured in industries vital to the war effort and whole-time civil defence workers back to their posts at the earliest possible moment.

Health of the A.T.S.

In answer to a question Captain MARGESSON gave the following statement of the medical arrangements in the Auxiliary Territorial Service: personnel who wish to report sick attend at the medical inspection room and can there receive outpatient treatment from the medical officer. Reception stations are provided for detachments of 300 and upwards and sick-bays are opened at medical inspection rooms for smaller units. At reception stations, the medical officer, who may be a woman medical practitioner, has a staff including V.A.D. nursing members and members of the A.T.S., and may have a sister or staff nurse, if required. A.T.S. orderlies are authorised in sick-bays where the strength of the detachment is over 40. A wing for A.T.S. patients has been established in a large military hospital near London, and there are A.T.S. wards in over 20 of the larger military hospitals. Military-families hospitals are also used for the A.T.S., and all the E.M.S. hospitals are available for them. There is an A.T.S. convalescent depôt, and a Red-Cross convalescent home is reserved for the use of women serving with the Forces. Courses of lectures in hygiene have been arranged as part of the training of officers and other ranks.

Replying to a further question Captain MARGESSON said that the decision to replace civilians by Royal Army Medical Corps women doctors where available on the panels formed to examine A.T.S. recruits was taken partly because the method of payment of civilian doctors was unsatisfactory and partly to economise in medical personnel.

Alien Doctors

In replying to a question Mr. BROWN said it was not intended to fix a maximum number of doctors who should have the benefit of the Medical Practitioners (Temporary Registration) Order, 1941. Up to date 28 doctors of enemy nationality have been selected for employment.

Emergency Treatment of Insured Patients

In answer to a question Mr. BROWN stated that: An insurance practitioner is required to make all necessary arrangements for securing the treatment of his insured patients where prevented from giving such treatment himself by urgency of other professional duties or other reasonable cause. If neither the practitioner nor his deputy is available for giving treatment in case of accident or other sudden emergency, any other insurance practitioner who may be available can be required to give it. A fee is payable to the last-mentioned practitioner, subject to the claim being passed by the panel committee. The fee is recoverable from the patient's own practitioner unless the panel committee are satisfied that there was reasonable cause for not summoning him.

Night Rotas for Doctors

Mr. GROVES asked the Minister whether, either in areas which had sustained war damage or, generally, any scheme had been formulated or was in contemplation to enable groups of civilian doctors, by rotation, to be on duty at night for all purposes and thus permit the others to obtain relief and rest; and how many insurance committees favoured such an arrangement.—Mr. BROWN replied: In a number of areas a rota of doctors for duty at first-aid posts, medical-aid posts in public shelters, and food and rest-centres has been arranged. Similar arrangements for providing medical attention for insured persons is a matter for agreement between the panel committee and insurance committee of each area concerned, and detailed information is not available.

Special Food for Children

Mr. G. MANDER asked the Minister whether he will consider the advisability of making arrangements for special food, such as eggs and fruit, to be supplied to children needing it for health reasons, through the clinics or some public agency,

with a view to making it unnecessary for mothers with children, who are ill and require attention, to stand for hours in queues?—Mr. BROWN: I have been in consultation with the Minister of Food, and I understand that he has under consideration the special needs of young children for such foods.

London Children killed by Enemy Action

In reply to a question Mr. HERBERT MORRISON, Home Secretary, said: The number of children under sixteen killed by enemy action in the whole of the London civil defence region between Jan. 1 and Feb. 28 this year was 76. The number injured and detained in hospital was 136.

Obituary

DAVID DIAMOND

M.R.C.P., D.P.H.

Dr. Diamond, deputy medical officer of health for Hull since 1939, has been killed in an air-raid on that city. Since the outbreak of war he had been largely responsible for the A.R.P. casualty services there and when he died he was on duty. Dr. Diamond was born in London but he spent part of his boyhood in South Africa and began his education there at the University of Cape Town. He qualified M.R.C.S. from St. Bartholomew's Hospital in 1923, and after holding some resident appointments he decided to take up public-health work. He gained experience of handling men and affairs in Holborn and the Port of London, and in 1931 he was appointed assistant medical officer of health for the Hull and Goole port authority. The same year he obtained his D.P.H. In 1934 he became senior assistant medical officer of health in charge of the tuberculosis department at Hull and his published work reflects his lively interest in the welfare and problems of the ex-tuberculous patient. Dr. Diamond leaves a widow and two young daughters.

Medical News

University of London

At recent examinations I. H. Evans and C. K. Warrick were successful in Part I of the postgraduate diploma in medical radiology.

Royal College of Physicians of London

At a meeting of the college on April 7, Sir Charles Wilson was elected president.

The licence was granted to Mohamed Abdul Hafeez (Osmania University and West London Hospital), and diplomas in ophthalmic medicine and surgery and in tropical medicine and hygiene were granted to those named in our issue of March 22 (p. 404) in a report of a meeting of the Royal College of Surgeons.

Society of Apothecaries of London

The following candidates, having completed the final examination, are granted the diploma of the society entitling them to practise medicine, surgery and midwifery: F. B. Beaver, Lond. Hosp.; J. S. McGillivray, McGill and Lond. Hosp.; R. South, Guy's; A. M. Williams, Lpool; C. H. Wood, Camb. and Middlesex.

University of Edinburgh

On April 4 the following degrees and diplomas were conferred:—

M.B., Ch.B.—K. W. Beetham, J. F. Cameron, Frances C. E. Hutchison, A. F. Lang, Bertha Macfie, W. A. T. M'Kendrick, A. K. M. Macrae, Joan M. M'William, T. M. Munro, E. J. Noble, M. R. Prestwich, Mary Scott-Wilson, J. G. Shearer, Robert Taylor, and C. C. M. Watson.

D.P.H.—Mohammad Nazir.

D.T.M.& H.—Eustace Akwei, D. W. Horn and Charles Odamitten-Easmon.

Among the casualties sustained in the loss of H.M.S. *Manistee* Temp. Surgeon Lieutenant L. R. Blair, M.D. St. And., R.N.V.R., is posted as missing, presumed killed.

At the next meeting of the Shaftesbury Military Hospital Medical Society on Tuesday, April 15th, at 3 P.M., the address will be given by the president, Major-General F. Casement.

Notes, Comments and Abstracts

A LIBRARY SEEKS SANCTUARY

Sir D'Arcy Power, having decided it is no longer safe to have a collection of books under one roof in London, is offering his library for sale at Messrs. Sotheby within the next few weeks. The collection includes a series of some sixty or seventy editions of the Regimen Sanitatis Salerni, chiefly French, German and English, a wonderful storehouse of popular dietetics from which came much of the information which is still in use, such as "The best Doctors are Dr. Diet and Dr. Quiet." It began life as a few hundred verses dedicated to the eldest son of William the Conqueror, though he never came to the throne. It was copied over and over again in every European language, each editor adding something of his own until, when printing was introduced, it had become a substantial volume with woodcut illustrations. The collection was formed with the object of showing how successive editions had been enlarged.

The library also contains most of the works of Osler and Harvey Cushing, many of which are autographed, and a series of unpublished letters from Dr. Weir Mitchell about William Harvey. Harvey and John Hunter are both well represented and there is a valuable collection of the writings of English surgeons of the sixteenth century. The chef d'œuvre is a small volume date 1595 which Dr. Bayley used to send as a Christmas present to his friends. This volume has an inscription in Dr. Bayley's handwriting when he presented it to the Lord Chief Justice of King James I and is therefore unique, for the name was not known and Bayley has signed this copy in full. He was a fellow of New College, Oxford and is buried in the ante-chapel. The book deals with diseases of eyesight, and subsequent editions, considerably altered, were issued by his nephew, Dr. Bannister. There is also a copy of the 1552 edition of the "Woman's Book," which lacks the last page, and an autographed letter from that genial anatomist, Dr. Oliver W. Holmes, sending a copy of "The Wonderful One-horse Shay."

PICTURES OF HEALTH

EDUCATION takes a short cut when it appeals to the eye. The Central Council for Health Education have always kept this well in mind, and in a new series of posters and leaflets they cover a remarkably wide tract of country. The eye tires quickly, so the posters are numerous and can be often changed; they are also by various artists, which means that the style has no chance to pall; and they show the advantages of exercise, cleanliness, of brushing your teeth, of fresh air and appropriate food from dozens of unexpected and attractive angles. The captious might wish for a little more emphasis on the droll side of the activities—wit in a poster stamps it on the memory as an anecdote drives home the point of a lecture. But they have every other quality to make them memorable and a few of them have fun too. The health leaflets are pithy and easily assimilated. They deal with diphtheria, measles, louse infestation, and purification of water-supplies, and are sold at cost price to local authorities for distribution by medical officers of health. The council think it would be useful if they could also be displayed in the waiting-rooms of doctors and dentists, and are ready to suppply a limited number of free copies to those who apply to the secretary, Tavistock House, London, W.C.1.

DOCTOR AND FARMER TOO

Prof. Thomas Bodkin's godfather and uncle by marriage, Frank MacMahon, inherited an estate in the west of Ireland but his affairs did not prosper. At the age of 40 he decided to become a doctor, qualified, and at Beauparc, co. Kildare, combined general practice with farming to his own great content and to that of all with whom, professionally or otherwise, he came in contact. He was a large man in every sense of the word, devoted no less to the sports and pastimes of the countryside than to his work, and idolised by his small godson who now writes of him with reverence and affection in a short but altogether charming book. "My Uncle Frank" (Robert Hale. 5*s*.) is in no sense a biography; it is a series

of sketches displaying some of the facets of a sturdy and attractive character and affording also more than a glimpse of a vanished Ireland. It is possible that Professor Bodkin views his own early youth through rose-coloured spectacles. Be that as it may, call it escapism if you must, there will be many who will be glad to share his view of the spacious and leisurely days at the beginning of the present troubled century.

AN X-RAY STRETCHER

PHILIPS METALIX have designed a new piece of X-ray apparatus which consists of a stretcher trolley combined with a Bucky table. It is a link between the non-mobile and mobile types of unit, and is therefore of value to a hospital with limited means which cannot afford an all-services apparatus but wants more finished radiographic work than is given by the ordinary mobile set. The makers claim that with the stretcher radiography of weight-bearing joints, skull radiography and pelvimetry may be satisfactorily performed.

It is doubtful, however, whether the ordinary mobile set has sufficient output to provide the necessary penetration for a lateral radiogram of the spine or pelvis, and the quality of the work will necessarily be limited by these factors. The Bucky table may be raised or lowered 9 in. and adjusted at any position from the horizontal to the vertical. The apparatus is a compromise and is unsuitable for specialised skull work, but for ordinary routine radiography it should be a useful adjunct to a mobile set.

Copies of the glossary of psychological terms (see THE LANCET, March 29, p. 424) prepared by the brain-injuries committee of the Medical Research Council may be had (price 1*d.*) from H.M. Stationery Office or through any bookseller.

Appointments

KEER, K. J. T., M.R.C.S. : examining factory surgeon for Wickham Market, Suffolk.
KELF, H. D., M.R.C.S., D.P.H. : temp. asst. M.O.H. (A.R.P.) for Portsmouth.
PRINGLE, G. H., M.R.C.S., D.P.H. : M.O.H. and school M.O. for Bridgwater, and assistant county M.O. for Somerset.
RAYNER, M. M.-S., M.B. Camb., D.P.M. : asst. physician at the Cassel Hospital for Functional and Nervous Diseases.
SHOULMAN, RAHUM, L.R.C.P. : temp. resident asst. M.O. at the borough isolation hospital, Bolton.

Births, Marriages and Deaths

BIRTHS

ANDERSON.—On March 29, at Exeter, the wife of Surgeon Lieut.-Commander E. W. Anderson, R.N.V.R.—a son.
MACFIE.—On March 31, at Alexandria, the wife of Major W. Gordon Macfie, R.A.M.C.—a son.
MOORE.—On March 31, in London, the wife of Mr. A. M. A. Moore, F.R.C.S.— a daughter.
NEWSOM.—On April 2, at Johannesburg, the wife of Dr. R. A. Newsom, Northern Rhodesian Medical Service—a daughter.
PHILP.—On March 30, at Boscombe, Bournemouth, the wife of Captain R. A. Philp, R.A.M.C.—a daughter.
SPOONER.—On April 3, at Cambridge, the wife of Flying-Officer W. H. C. Spooner, R.A.F.V.R., of Blandford, Dorset—a son.
THOMPSON.—On April 2, at Market Harborough, the wife of Dr. J. F. Thompson—a daughter.

MARRIAGES

FELLOWS—THRUPP.—On Feb. 26, in Birmingham, Joseph William Edward Fellows, M.B., lieutenant R.A.M.C., to Cecile Patricia Thrupp, M.R.C.S.
WAY—CORSON.—On April 4, at Pennal, Geoffrey Leslie Way, M.R.C.S., captain R.A.M.C., to Edith Mairi Reid Corson.

DEATHS

BEACH.—On April 3, at Reading, Thomas Boswall Beach, C.M.G., C.B.E., M.R.C.S., colonel A.M.S.
DUNN.—On April 3, at Bengeo, Hertford, Robert Ayton Dunn, M.D., B.Hy. Durh., D.P.H., formerly medical officer of health for Hertford.
HAJEK.—On April 3, at Dalcham Gardens, N.W.3, Markus Hajek, formerly professor of laryngology in the University of Vienna, aged 79.
HARTIGAN.—On April 3, Thomas Hartigan, M.D. Durh., Lancaster Close, W.2, aged 70.
HOGG.—On April 3, at Iverna Court, Kensington, Frederick Stanley Hogg, L.R.C.P.E.
TURNER.—On April 7, at Hove, Sir George Robertson Turner, K.B.E., C.B., F.R.C.S., surgeon rear-admiral, 1914–18, aged 85.

Infectious Disease in England and Wales

WEEK ENDED MARCH 29

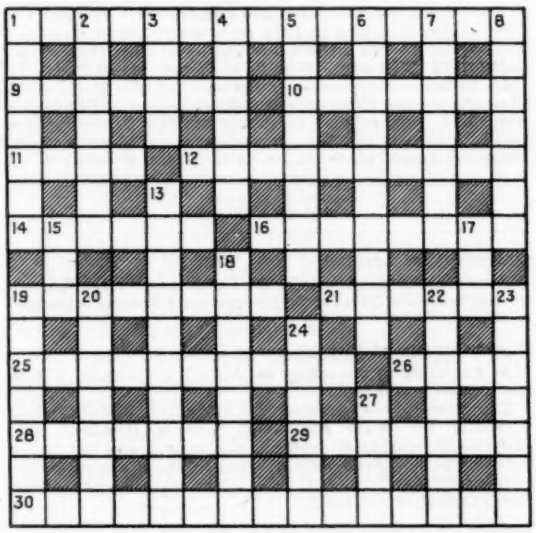
Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1212; whooping-cough, 4440; diphtheria, 1038; enteric fever, 20; measles (excluding rubella), 14,589; pneumonia (primary or influenzal), 1264; puerperal pyrexia, 154; cerebrospinal fever, 319; poliomyelitis, 3; polio-encephalitis, 2; encephalitis lethargica, 5; dysentery, 140; ophthalmia neonatorum, 79. No case of cholera, plague or typhus fever was notified during the week.

Deaths.—In 126 great towns there was no death from smallpox or scarlet fever, 1 from enteric fever, 39 (2) from whooping-cough, 20 (1) from measles, 30 (1) from diphtheria, 30 (4) from diarrhœa and enteritis under 2 years, and 87 (9) from influenza. The figures in parentheses are those for London itself.

Newcastle-on-Tyne reported the fatal case of enteric fever. There were 7 deaths from whooping-cough at Liverpool, 6 at Birmingham, and in the same week Glasgow reported 13.

The number of stillbirths notified during the week was 247 (corresponding to a rate of 46 per thousand total births), including 15 in London.

LANCET CROSSWORD



ACROSS

1. Always in the right—unlike Huxley's bishops. (Two words, 9, 6.)
9. Pure guts when there's an R in it (7).
10. A member of B company (7).
11. Carcinogens (4).
12. Are these found in Labour windows ? (Two words, 5, 5.)
14. Result of a tanning (6).
16. Nasty looks (8).
19. Even beer-drinkers can get it since they took the B out of beer (8).
21. You can add to them for twenty-five years (6).
25. A pot, I agree, this old Greek judge (10).
26. Symptomatic if sardonic (4).
28. Adjective for yeast (7).
29. The man behind the gas warning (7).
30. Traces the brain-waves (15).

DOWN

1. Those who die here are unpopular (7).
2. The jealous shade (7).
3. Can be large and surgical or small and international (4).
4. A *B.* that was once too busy (6).
5. "A lot dies in it," as the post-mortem attendant said (8).
6. Progenitor stricken in years. (Two words, 4, 6.)
7. This good turn always leaves things upside down (7).
8. Vice employs ? (7).
13. No pay palls here. (Two words, 5, 5.)
15. Denoted by the mirror of Venus (3).
17. Did he prescribe for horse-coughs ? (3).
18. Senile juvenility (8).
19. The conversation of an agreeable 29 ? (7).
20. (Reversed.) Opacities here are a haze in the glaze (7).
22. Not a thing to 26 about—or, for that matter, with. (Two words, 4, 3.)
23. Coördinate action of muscles (4).
24. Given scope it lends things a solid look (6).
27. You do it if you move, you create it if you succeed, and if you go wrong you end up in it (4).